

U.S. Department of Commerce
National Institute of Standards and Technology
(formerly National Bureau of Standards-NBS)

**COMMERCIAL STANDARD CS45-60
DOUGLAS-FIR PLYWOOD**

Commercial Standard CS45-60, Douglas-Fir Plywood (included in) Product Standard PS1-83, Construction and Industrial Plywood.

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COMMERCIAL STANDARD CS45-60

Douglas Fir Plywood

**A recorded
voluntary standard of the
trade published by
the U.S. Department
of Commerce**



**For Sale by the Superintendent of Documents
U.S. Government Printing Office, Washington 25, D.C. Price 15 cents**

AMENDMENT NO. 1

TO

DOUGLAS FIR PLYWOOD

COMMERCIAL STANDARD CS45-60

(Effective Date: February 1, 1962)

(To be inserted in printed edition of CS45-60)

1. Paragraph 4.4.2 Veneers. - Add the following sentence:

"The average veneer thickness shall conform to the limitations given in this standard within a tolerance of 5% of the specified nominal thickness, measured before layup." *

* See Section 11, Nomenclature and Definitions.

2. Paragraph 4.5 Interior Type Plywood. - Make the following editorial change:

In second sentence add "lodgepole pine" after "Idaho White pine."

3. Section 11, Nomenclature and Definitions. - Add the following definition:

"Nominal thickness. - Full designated fractional thickness. For example, 1/10 inch nominal is 0.10 inch, 1/2 inch nominal is 0.50 inch."

COMMODITY STANDARDS DIVISION
OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE

January 2, 1962
USCOMM-DC- 46,175

TS-5565

AMENDMENT NO. 2

TO

DOUGLAS FIR PLYWOOD

COMMERCIAL STANDARD CS45-60

(Effective Date: April 16, 1962)

(To be inserted in printed edition of CS45-60)

Paragraph 4.4.4.4 Grade D Veneer -

Under caption "White Pocket" delete

"In inner plies only."

Also delete caption "On Backs" and the
sentence under that caption.

COMMODITY STANDARDS DIVISION
OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE

March 16, 1962
USCOMM-DC-46,608

AMENDMENT NO. 3
TO
DOUGLAS FIR PLYWOOD
COMMERCIAL STANDARD CS45-60
(Effective Date: July 1, 1962)

(To be inserted in printed edition of CS45-60)

1. Paragraph 4.1 Workmanship - Add the following sentence:

"Gaps between adjacent pieces of core or centers shall not exceed 1 inch*, and the average of all gaps occurring in a panel shall not exceed 3/4 inch**. Every effort shall be made to produce closely butted core joints, however."

"* See "Core Gaps", Section 11, Nomenclature and Definitions.

"** See Appendix."

2. Section 11, Nomenclature and Definitions - Amend definition of "Core Gaps" by adding the following sentence:

"A core gap (center gap) shall be considered to exceed the maximum 1 inch limitation specified in Paragraph 4.1 when the width of such gap exceeds 1 inch for a depth of 8 inches measured from the panel edge."

3. Appendix - Add new paragraph as follows:

"In addition to the above 5% grade tolerance a 5% tolerance shall apply separately to the core gap limitations set forth in Paragraph 4.1."

4. Paragraph 4.4.2 Veneers - To clarify the wording, to include material given in previous Amendment No. 1 and to cover 1/12 inch core veneer, rearrange the paragraph as follows:

"Except as noted below, veneers shall be 1/10 inch or thicker in panels 3/8 inch rough thickness or over, 1/12 inch or thicker in panels of lesser thickness. Veneers 1/16 inch or thicker may be used in 5-ply 3/8 inch Exterior type panels and as centers only in other 5-ply panels. Veneers 1/12 inch or thicker may be used as core in 5-ply 1/2 inch panels. In no case, however, shall veneer be thicker than 1/4 inch. The average veneer thickness shall conform to the limitations given in this standard within a tolerance of 5% of the specified nominal thickness*, measured before layup. Sound firm stain shall not be considered a defect. End butt joints are prohibited in any veneer. Plywood thicker than 3/8 inch sanded or 7/16 inch rough shall have a minimum of 5 plies."

"* See Section 11, Nomenclature and Definitions."

COMMODITY STANDARDS DIVISION
OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE

June 1, 1962
USCOMM-DC-47,019

CS45-60

(3)

Modify Table 4 to include STRUCTURAL as follows:

TABLE 4. STANDARD STOCK DOUGLAS FIR PLYWOOD SIZES¹ - INTERIOR TYPE

Grade	Width ² (Inch)	Length ² (Inch)	Thickness ² 3 4 5 (Inch)				
(Grades N-N through C-D (Plugged) to be unchanged)							
<u>Structural</u> ⁷	48 ₆	96 120	5/16 5/16	3/8 --	1/2 --	5/8 5/8	3/4 --
C-D int. (Sheathing, Int.) with Exterior glue (See Section 7 Special Constructions)	48 ₆	96 120	5/16 5/16	3/8 --	1/2 --	5/8 5/8	3/4 --
C-D, Int. (Sheathing, Int.) unsanded	48 ₆	96 120	5/16 5/16	3/8 --	1/2 --	5/8 5/8	3/4 --

⁵ Sanded 2 sides, except Underlayment, C-D (Plugged), Structural, C-D sheathing with Exterior Glue, and C-D sheathing.

⁷ See Section 7, Special Constructions.

AMENDMENT NO. 4

TO

DOUGLAS FIR PLYWOOD

COMMERCIAL STANDARD CS45-60

(Effective Date: March 1, 1963)

(To be inserted in printed edition of CS45-60)

1. Paragraph 4.4.2 Veneers. - Modify last sentence as follows:

"Plywood thicker than 3/8 inch sanded or 7/16 inch rough shall have a minimum of 5 plies except that in the C-D Interior and C-D (Plugged) Interior grades only, 1/2 inch thick panels may have a minimum of 3 plies."

2. Table 4. - Modify footnote 4 as follows:

"4. Minimum number of plies required for standard constructions:

3 plies for 1/4, 5/16, and 3/8 inch.

3 plies for 1/2 inch C-D Interior sheathing and C-D plugged only.

5 plies for 1/2, 5/8, and 3/4 inch, except as noted above.

7 plies for 7/8 to 1-3/16 inch."

COMMODITY STANDARDS DIVISION
OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE

TS-5621
March 1, 1963

AMENDMENT NO. 5

TO

DOUGLAS FIR PLYWOOD

COMMERCIAL STANDARD CS45-60

(Effective Date: April 1, 1963)

(To be inserted in printed edition of CS45-60)

1. Paragraph 4.5. - Revise second sentence to read:

"All veneer used in Interior type shall be of 'Coast type' Douglas fir, except that species included in CS122-60, Western softwood plywood (Douglas fir 'Interior North' or 'Interior South', Western hemlock, Sitka spruce, noble fir, commercial white fir, Alaska cedar, Western red cedar, Port Orford cedar, California redwood, ponderosa pine, sugar pine, Idaho white pine, lodgepole pine, Engelmann spruce, as well as alder, lauan, and Western poplar) may be used for inner plies only in all Interior type grades except B-B Concrete Form and C-D (sheathing)."

2. Page 14. - Insert a new paragraph as follows:

"9.3 Grademarks or trademarks which refer to this Standard shall denote adhesive type only by means of the following designations: 'EXTERIOR', 'EXT.', 'INTERIOR', 'INT.', 'STRUCTURAL INTERIOR', or 'STRUC-INT.' In addition, the notation 'EXTERIOR GLUE' may be used, where applicable, to supplement the designations 'STRUCTURAL INTERIOR' or 'STRUC-INT.' Any further references to adhesive bond, including those which imply premium performance or special warranty by the manufacturer, as well as manufacturer's proprietary designations, shall be separated from the grade-marks or trademarks of the testing agency by not less than 6 inches."

COMMODITY STANDARDS DIVISION
OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE

A M E N D M E N T No. 6
COMMERCIAL STANDARD CS45-60
DOUGLAS FIR PLYWOOD

Effective May 8, 1964

This amendment forms part of Commercial Standard CS45-60. All copies the standard should include the following changes:

Page 7. Modify Table 1 by inserting footnote 8 for unsanded grades, as shown below:

Table 1. Interior Type Grades -- Minimum Quality of Veneers				
Grade	Face	Back	Inner Plies	Additional Limitations
(Grades N-N through C-D (Plugged) to be unchanged)				
C-D Int. (Sheathing, Int.) with Exterior Glue (see Section 7, Special Constructions)	C	D	D	Unsanded grade <u>8/</u>
C-D, Int. (Sheathing, Int.)	C	D	D	Unsanded grade <u>8/</u>

8/ Shall not be sanded, touch-sanded, or sized by any mechanical means.

Page 7. Modify Table 2 by inserting footnote 5 for unsanded grade, as shown below:

Table 2. Exterior Type Grades -- Minimum Quality of Veneers				
Grade	Face	Back	Inner Plies	Additional Limitations
(Grades Marine Ext. through C-C Ext. (Plugged) to be unchanged)				
C-C Ext. (Sheathing, Ext.)	C	C	C	Unsanded grade <u>5/</u>

5/ Shall not be sanded, touch-sanded, or sized by any mechanical means.

Page 14. Par. 9.2 Add the following sentence for clarification: "The exceptions above apply only to admission of species covered in CS122-60, Western Softwood Plywood."

OFFICE OF COMMODITY STANDARDS
NATIONAL BUREAU OF STANDARDS
U. S. DEPARTMENT OF COMMERCE

AMENDMENT NO. 8
TO
DOUGLAS FIR PLYWOOD, COMMERCIAL STANDARD CS45-60

(Insert in printed editions of the standard)

The Amendment will require the following changes in the printed edition:

(1)

Section 7, Special Constructions. Add a STRUCTURAL grade as follows:

STRUCTURAL GRADE

STRUCTURAL, a panel designed for engineered applications, is C-D grade bonded with Exterior glue meeting the following special limitations:

- White pocket in any area larger than the size of the largest knothole, pitch pocket, or split specifically permitted in D grade shall not be permitted in any ply.
- Sound, tight knots shall not exceed 2-1/2 inches measured across the grain in D grade veneer.
- Plugs (circular, "dog bone", and leaf shaped), including multiple repairs, shall not exceed 4 inches in width in D grade veneer.
- Panels 1/2 inch and greater in thickness shall consist of a minimum of 5 plies.
- Panels shall not be sanded, touch-sanded, or sized by any mechanical means.

In addition to the above, all requirements for C-D SHEATHING shall be met.

Bond: STRUCTURAL grade shall be bonded with an adhesive identical to those for Exterior plywood and meeting the Exterior performance requirements of this Standard.

Classes: Class I -- All plies of Coast type Douglas fir or Western larch.

Class II -- Inner plies of Group 1 and Group 2 WSP species, as defined in CS122-60, separately or in combination. Coast type Douglas fir and Western larch faces.

CS45-60

(2)

Modify Table I to include STRUCTURAL as follows:

TABLE 1. INTERIOR TYPE GRADES -- MINIMUM QUALITY OF VENEERS

Grade	Face	Back	Inner Plies	Additional Limitations ¹
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(Grades N-N through C-D (Plugged) to be unchanged)

<u>Structural</u>	(See Section 7, Special Constructions	Unsanded grade ⁸
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C-D, Int. (Sheathing, Int.) with Exterior glue. (See Section 7 Special Constructions)	C	D	D	Unsanded grade ⁸
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C-D, Int. (Sheathing, Int.)	C	D	D	Unsanded grade ⁸
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⁸ Panels shall not be sanded, touch-sanded, or sized by any mechanical means.
(Footnote 8 added by amendment May 8, 1964).

CS122-60

Modify Table 4 to include STRUCTURAL as follows:

TABLE 4. STANDARD STOCK WESTERN SOFTWOOD PLYWOOD SIZES¹ - INTERIOR TYPE

Grade	Width ² (Inch)	Length ² (Inch)	Thickness ^{2 3 4 5} (Inch)				
(Grades N-N through C-D (Plugged) to be unchanged)							
<u>Structural</u>	48 ₆	96	5/16	3/8	1/2	5/8	3/4
	60	120	5/16	- -	- -	5/8	- -
C-D Int. (Sheathing, Int.) with Exterior glue. (See Section 7 Special Constructions)	48 ₆	96	5/16	3/8	1/2	5/8	3/4
	60	120	5/16	- -	- -	5/8	- -
C-D, Int. (Sheathing, Int.) unsanded.	48 ₆	96	5/16	3/8	1/2	5/8	3/4
	60	120	5/16	- -	- -	5/8	- -

⁵ Sand two sides, except Underlayment C-D (Plugged), Structural, C-D sheathing with Exterior glue, and C-D sheathing.

⁷ See Section 7, Special Constructions.

U.S. DEPARTMENT OF COMMERCE
BUSINESS AND DEFENSE SERVICES ADMINISTRATION
OFFICE OF TECHNICAL SERVICES
Commodity Standards Division

EFFECTIVE DATE

Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors hereinafter listed, this Commercial Standard was issued by the U.S. Department of Commerce, effective November 14, 1960.



FREDERICK H. MUELLER, *Secretary*

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, Business and Defense Services Administration, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforceable through usual legal channels as a part of the sales contract.

Commercial Standards originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The division by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the division assures continuous servicing of each Commercial Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

Douglas Fir Plywood

Tenth Edition

Effective November 14, 1960

1. PURPOSE

1.1 The purpose of this Commercial Standard is to establish nationally recognized standards for the principal grades and sizes of Douglas fir plywood.¹ Because of the extended application of Douglas fir plywood to a large number of new uses, the standard grades given herein are offered as a common basis of understanding throughout the industry. The standard is intended as an aid in the procurement of the proper grade of material and the proper type as to moisture resistance for its varied uses; and to serve as a guide for buyers, sellers, architects, engineers, contractors, industrial users, and home owners in meeting their needs by use of nationally accepted standard grades.

2. SCOPE

2.1 This Commercial Standard covers the principal grades of Interior type, Exterior type and overlaid plywood. It includes tests, standard sizes, size tolerances, marking and certification, and nomenclature and definitions.

3. DEFINITIONS

3.1 Douglas fir plywood is a built-up board of laminated veneers in which the grain of each piece is at right angles to the one adjacent to it. The adequately dried veneer is united under high pressure with a bonding agent, making the joints as strong as or stronger than the wood itself. The alternating direction of the grain of each contiguous layer of wood equalizes the strains, and in this way minimizes shrinkage and warping of the product, and prevents splitting. Overlaid plywood is produced in a like manner with the special facings added.

3.2 Only Douglas fir grown in California, in Oregon west of 120° longitude, (the northern extension of the California-Nevada boundary), and in Washington west of the Columbia River and west of the Okanogan River shall be classified as "Coast type" and be acceptable under this stand-

¹ Wherever Douglas fir plywood is referred to in this Standard, except in par. 3.2 and Sec. 10, Method of Ordering, it shall be considered as including plywood manufactured from Western larch (*Larix Occidentalis*), a species indigenous to Idaho, Montana, and Washington east of the Cascade range, growing predominantly in the Rocky Mountain plateau area.

ard, except that all Douglas fir growing in that Ochoco National Forest through which 120° longitude passes shall also be classed as "Coast type." All Douglas fir timber or veneer produced east of the above-described geographic limits shall be classed as a "Western softwood" species, covered by the provisions of Commercial Standard CS122. (See footnote 1.)

3.3 **Panel Designation.**—In every panel, the same species of wood used for the face shall also be used for the back, or opposite face, and this species shall serve to designate the kind of plywood for that panel.

4. REQUIREMENTS

4.1 **Workmanship.**—Unless otherwise specified, plywood shall be sanded on two sides to meet requirements of veneer as set forth in paragraph 4.4.4. When specified rough or unsanded, plywood may have paper tape on either face or back, or both, except that in C-C Exterior no tape used for veneer splicing shall be permitted. It shall be well manufactured and free from blisters, laps, and defects, except as permitted in the specific rules for the various grades. Exposed veneer on both sides of panel shall have the bark or tight surface out. Plies directly under surfaces of overlaid panels are not considered exposed veneers. Faces and backs of panels shall be full length and width except as specified. Inner plies shall be full width and length, except that one edge or end void not exceeding $\frac{1}{8}$ inch in depth or 8 inches in length per panel will be acceptable. Shims or strips of veneer shall not be used to repair such voids. However, filling with approved plastic fillers neatly applied shall be admitted. Staples are prohibited.

4.2 **Bonding.**—The entire area of each contacting surface of the plywood shall be bonded with material best adapted to each use classification. No tape shall be used in any glue-line.

4.3 **Loading or Packing.**—The plywood shall be securely loaded or packed to insure delivery in a clean and serviceable condition.

4.4 **Types of Plywood.**—Douglas fir plywood is made in two types. Interior (Int.) and Exterior (Ext.), with the type referring to the durability of the adhesive bond between the plies.

Within each type there are several grades, which are established by the quality of the veneer of the panel as hereinafter defined. The grade descriptions set forth the minimum requirements, and, therefore, the majority of panels in any shipment will exceed the specification given.

4.4.1 Moisture Content.—Moisture content of panels at time of shipment from mill shall not exceed 18 percent of dry weight as determined by oven-dry test.

4.4.2 Veneers.—Veneers shall be $\frac{1}{10}$ inch or more thick before lay-up in panels $\frac{3}{8}$ inch rough thickness or over. Veneers shall be $\frac{1}{12}$ inch or more thick before lay-up in panels of lesser thickness, except that veneers not less than $\frac{1}{16}$ inch thick before lay-up may be used in 5-ply, $\frac{3}{8}$ inch thick Exterior type panels, and as centers only in other 5-ply panels. In no case, however, shall veneer be thicker than $\frac{1}{4}$ inch. Sound firm stain shall not be considered a defect. End butt joints are prohibited in any veneer. Plywood thicker than $\frac{3}{8}$ inch sanded or $\frac{7}{16}$ inch rough shall have a minimum of 5 plies.

4.4.2.1 Scarfed Veneers.²—Veneer scarfed joints shall not have a slope steeper than 1 to 8, but may be specified as less than 1 to 8. Veneer in the scarf area shall not contain defects which reduce its effective cross-section by more than 20 percent. Veneer scarfed joints shall be glued with a waterproof adhesive.

4.4.3 Ring Count.—A minimum of six annular rings per inch, as measured in block at time of peeling, shall be required for both faces of all grades.

4.4.4 Veneer Classification.—All veneers used in the different plywood grades shall be one of the following (grade N being the best of the five classifications):

4.4.4.0 Grade N veneer (Intended for natural finish).

General.

Shall be—smoothly cut 100 percent heartwood, free from knots, knotholes, pitch pockets, open splits, other open defects, and stain.

—of not more than 2 pieces.

—well matched for color and grain and well joined with joint parallel to edges, when of more than one piece.

Permits—suitable plastic fillers to fill:

- (a) Small cracks or checks not more than $\frac{1}{32}$ inch wide.
- (b) Small splits or openings up to $\frac{1}{16}$ inch wide if not exceeding 2 inches in length.
- (c) Small chipped areas or openings not more than $\frac{1}{8}$ inch wide by $\frac{1}{4}$ inch long.

Growth Characteristics.

Permits—pitch streaks averaging not more than $\frac{3}{8}$ inch in width and blending with color of wood.

Repairs.

² See par. 6.2 for Scarfed Panels.

Shall be—neatly made and parallel to grain.

—limited to a total of six in number in any 4-foot by 8-foot face, with proportionate limits for other sizes.

—well matched for color and grain.

Permits—patches limited to three “router” patches not exceeding $\frac{3}{4}$ inch in width and $3\frac{1}{2}$ inches in length.

—no overlapping.

—shims not exceeding 12 inches in length.

4.4.4.1 Grade A veneer (Suitable for painting.)

General.

Shall be—firm, smoothly cut and free from knots, pitch pockets, open splits and other open defects.

—well joined when of more than one piece.

Permits—suitable plastic fillers to fill:

- (a) Small cracks or checks not more than $\frac{1}{32}$ inch wide.
- (b) Small splits or openings up to $\frac{1}{16}$ inch wide if not exceeding 2 inches in length.
- (c) Small chipped areas or openings not more than $\frac{1}{8}$ inch wide by $\frac{1}{4}$ inch long.

Growth Characteristics.

Permits—pitch streaks averaging not more than $\frac{3}{8}$ inch in width, blending with color of wood.

—sapwood.

—discolorations.

Repairs.

Shall be—neatly made and parallel to grain, limited to a total of 18 in number, excluding shims, in any 4-foot by 8-foot face; proportionate limits on other sizes.

Permits—patches:

- (a) Which are symmetrical and of “boat,” “router” and “sled” type only, including die-cut patches if edges are cut clean and sharp.
- (b) Not exceeding $2\frac{1}{4}$ inches in width singly.
- (c) Multiple, consisting of not more than 2 patches, neither of which may exceed 7 inches in length if either is wider than 1 inch.

—shims, except as multiple repairs.

4.4.4.2 Grade B veneer.

General.

Shall be—solid and free from open defects except as noted.

Permits—slightly rough but not torn grain.

—minor sanding and patching defects, including sander skips not exceeding 5 percent of panel area.

—suitable plastic fillers to fill:

- (a) Small splits or openings up to $\frac{1}{16}$ inch wide if not exceeding 2 inches in length.
- (b) Small chipped areas or openings not more than $\frac{1}{8}$ inch wide by $\frac{1}{4}$ inch long.

Growth Characteristics.

- Permits—knots up to 1 inch if both sound and tight.
 —pitch streaks averaging not more than 1 inch in width.
 —discolorations.

Open Defects.

- Permits—splits not wider than $\frac{1}{32}$ inch.
 —vertical holes not exceeding $\frac{1}{16}$ inch in diameter (caused by ambrosia beetles) if not exceeding an average of 1 per square foot in number.
 —horizontal or surface tunnels limited to $\frac{1}{16}$ inch across, 1 inch in length, and to 12 in number in a 4-foot by 8-foot panel, or proportionately in panels of other dimensions.

Repairs.

Shall be—neatly made.

- Permits—patches (“boat,” “router” and “sled”) not exceeding 3 inches in width individually where occurring in multiple repairs or 4 inches in width where occurring singly.
 —plugs (circular, “dog bone” and leaf shaped) not exceeding 3 inches in width individually where occurring in multiple repairs or 4 inches in width where occurring singly.
 —shims.
 —synthetic plugs which present solid level, hard surface not exceeding above dimensions.

4.4.4.3 Grade C veneer.

General.

- Permits—sanding defects that will not impair the strength or serviceability of the panel.
 —C grade backs to be narrow on one edge or short on one end only, but by not more than $\frac{1}{8}$ inch for $\frac{1}{2}$ panel length or width.

Growth Characteristics.

- Permits—knots, if tight and not more than $1\frac{1}{2}$ inches in least dimension.

Open Defects.

- Permits—knotholes not larger than 1 inch across grain.
 —open pitch pockets not wider than 1 inch.
 —splits not wider than $\frac{3}{16}$ inch that taper to a point.
 —worm and borer holes not more than $\frac{5}{8}$ inch wide and $1\frac{1}{2}$ inches long.

Repairs.

Shall be—neatly made.

- Permits—patches (boat, including die cut) not exceeding 3 inches in width individually where occurring in multiple repairs or 4 inches in width where occurring singly.
 —plugs (circular, “dog bone” and leaf shaped) not exceeding 3 inches in width individually where occurring in multiple repairs or 4 inches in width where occurring singly.
 —synthetic plugs which present solid, level, hard surface not exceeding above dimensions.

4.4.4.4 Grade D veneer. (May be used only in Interior type panels.)³

General.

³ See also Sec. 7, Special Constructions.

- Permits—except as otherwise specified, any number of plugs, patches, shims, worm or borer holes, sanding defects, and other characteristics, provided they do not seriously impair the strength or serviceability of the panel.

- D grade backs to be narrow on one edge or short on one end only, but by not more than $\frac{1}{8}$ inch for $\frac{1}{2}$ panel length or width.

Open Defects.

- Permits—knotholes not exceeding $2\frac{1}{2}$ inches in maximum dimension.

- pitch pockets not exceeding 2 inches wide by 4 inches long or of equivalent area if of lesser width.

—splits

$\frac{1}{2}$ inch by one-fourth panel length.

$\frac{1}{4}$ inch by one-half panel length.

$\frac{3}{16}$ inch by full panel length.

Required to taper to a point.

Shall not exceed $\frac{1}{2}$ inch width at widest point.

White Pocket⁴

In inner plies only—

Any area 24 inches wide across the grain and 12 inches long, in which light or heavy white pocket occurs, shall not contain more than three of the following characteristics, in any combination:

- 6 inches width of heavy white pocket.
- 12 inches width of light white pocket.
- One knot or knothole, $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches, or two knots or knotholes, 1 inch to $1\frac{1}{2}$ inches; knots and knotholes less than 1 inch shall not be considered. Size of any knot or knothole shall be measured in greatest dimension. Any repair in white pocket area shall be treated for grading purposes as a knothole.

On backs—

white pocket in any area larger than the size of the largest knothole, pitch pocket or split, specifically admitted in this paragraph, shall not be permitted.

4.4.5 Overlays.—Overlaid plywood is Douglas fir plywood to which has been added resin-impregnated fiber faces on one or both sides. It is made in two standard types, “High Density” and “Medium Density,” with the type referring to the surfacing materials as hereinafter defined. In addition, there may be other surfacing materials having special characteristics which do not fit the exact description of High Density or Medium Density. These must meet the test requirements in paragraphs 5.3 and 5.4.2 and shall be identified as “special.” The resin-impregnated faces are permanently fused to the base panel under heat and pressure. Although designed for either ex-

⁴ White pocket is a form of decay (fomes pini) that attacks most conifers, including, of course, Douglas fir. “It has never been known to develop in woods in service.” (J. S. Boyce, “Forest Pathology”.) In plywood, the routine drying of veneer at temperatures of 350° F. or more, effectively removes any possibility of the decay surviving. The degree and extent of white pocket permitted under this Standard in par. 4.4.4.4 (describing D veneer), has been established through a two-year research project at the U.S. Forest Products Laboratory.

terior or interior service, all overlaid plywood is made in the Exterior type. This refers to the adhesive bond between plies, between the overlay surface and the base panel, and to the durability of the surface itself.

4.4.5.1 High Density Type.—The surfacing on the finished product shall be hard, smooth, and of such character that further finishing by paint or varnish is not required. It shall consist of a cellulose-fiber sheet or sheets, in which not less than 40 percent by weight of the laminate shall be a thermosetting resin of the phenol or melamine type. The resin-impregnated material shall be not less than 0.009 inch thick and shall weigh not less than 60 pounds per 1,000 square feet of single face before pressing, including both resin and fiber. The resin impregnation shall be sufficient to attach the surfacing material to the plywood. This bond shall be equal in performance to the gluelines between the sheets of veneer which make up the plywood. The overlay face usually comes in natural translucent color, but certain other colors are available or may be used by manufacturers for identification.

4.4.5.2 Medium Density Type.—The resin-impregnated facing on the finished product shall present a smooth, uniform surface suitable for high-quality paint finishes. It shall consist of a cellulose-fiber sheet in which not less than 20 percent by weight of the laminate shall be a thermosetting resin of the phenol or melamine type. The resin-impregnated material shall be not less than 0.012 inch thick and shall weigh not less than 65 pounds per 1,000 square feet of single face before pressing, including both resin and fiber. An integral phenolic resin glueline shall be applied to one surface of the facing material to bond it to the plywood. This bond shall be equal in performance to the gluelines between the sheets of veneer which make up the plywood. The overlay face shall be a solid color. Some evidence of the underlying grain may appear, but, compared to the nature of the "High Density" surface, there shall be no consistent show-through.

4.5 Interior Type Plywood.—This type of plywood has a high degree of moisture resistance, and is suitable for constructions where its application requires that it shall retain its original form and practically all its strength when occasionally subjected to a thorough wetting and subsequent normal drying. All veneer used in Interior type shall be of "Coast type" Douglas fir, except that Douglas fir "Interior North" or "Interior South," Western hemlock, Sitka spruce, Noble fir, Commercial White fir, Alaska cedar, Port Orford cedar, California redwood, Ponderosa pine, Sugar pine, and Idaho White pine, as well as alder and lauan may be used for inner plies only in all Interior type grades, except B-B (Concrete Form) and C-D (Sheathing)*. Plywood of this type shall meet the test requirements set forth in para-

graphs 5.2 and 5.4.1. This type is available in the grades given in table 1.

4.5.1 Mold-Resistance.—Interior Sheathing, Interior Underlayment, C-D Plugged, Interior, and Concrete Form grades shall be made with an adhesive possessing a mold-resistance equivalent to that created by adding 5 pounds of pentachlorophenol, or its sodium salt, per 100 pounds of dry glue base to plain protein glues.

4.5.2 Resistance to Elevated Temperatures.—Interior Sheathing, Interior Underlayment, C-D Plugged, and Concrete Form grade shall be made with an adhesive possessing resistance to temperatures up to 160° F., at least equal to that of plain protein glue. Urea resin glue shall not be used in these grades unless evidence is submitted indicating performance equivalent to plain protein glues.

4.6 Exterior Type Plywood.—This type represents the ultimate in moisture resistance—a plywood that will retain its original form and strength when repeatedly wet and dried and otherwise subjected to the elements, and which is suitable for permanent exterior use. It shall be free from core gaps that impair the strength or serviceability of the panel. All patches and shims shall be set with adhesives meeting performance standards for Exterior plywood. All veneer used in Exterior type panels shall be of Douglas fir and of C grade as defined in paragraph 4.4.4, or better. All Exterior panels shall be so designated by a distinctive symbol, "Ext.," branded or stamped on each panel. Plywood of this type shall meet the test requirements set forth in paragraphs 5.3 and 5.4.2. This type is available in the grades given in table 2.

4.7 Overlaid Plywood.—Table 3 gives the types of overlaid plywood that are available.

5. SAMPLING AND TESTING

5.1 Sampling.—Ten sample panels for testing shall be taken at random from those being sampled. These panels shall be selected to represent as many variations in grades and thicknesses as possible, and shall also be selected from locations distributed as widely as is practicable throughout those being sampled. From each Exterior panel selected for testing, three pieces shall be cut at random and from each piece ten test specimens shall be cut. From each Interior panel selected, three test specimens 2 inches wide by 5 inches along the grain shall be cut from each end approximately at mid-width of the panel, and from each edge approximately at mid-length of the panel, while a fifth set of three test specimens shall be cut from somewhere near the middle or center of the panel. Overlaid plywood shipments shall be sampled in the same manner as Exterior plywood.

5.2 Test for Interior Type.—The test specimens shall be submerged in water at room temperature for a period of 4 hours, and then dried at a temperature between 100° F. and 105° F. for a

* (See par. 9.2.)

Table 1. Interior Type Grades — Minimum Quality of Veneers

Grade	Face	Back	Inner Plies	Additional Limitations ¹
N-N, Int. (Natural Finish Two Sides) ²	N	N	C ³	Sanded 2 sides.
N-A, Int. (Natural Finish)	N	A	C ³	Sanded 2 sides.
N-D, Int. (Natural Finish One Side) ⁴	N	D	D	Sanded 2 sides.
A-A, Int.	A	A	D	Sanded 2 sides.
A-B, Int.	A	B	D	Sanded 2 sides.
A-D, Int.	A	D	D	Sanded 2 sides.
B-B, Int. (Concrete Form, Int.)	B	B	C (All Inner Plies)	Edge-sealed and, unless otherwise specified, mill-oiled. Sanded 2 sides.
B-B, Int.	B	B	D	Sanded 2 sides.
B-D, Int.	B	D	D	Sanded 2 sides.
Int. Underlayment	C (Plugged) ⁵	D	C ⁶ and D	Sanded 2 sides or touch-sanded ⁷ .
C-D (Plugged) ⁵ , Int.	C (Plugged) ⁵	D	D	Unsanded or touch-sanded ⁷ .
C-D Int. (Sheathing, Int.) with Exterior Glue (see section 7, Special Constructions)	C	D	D	Unsanded grade.
C-D, Int. (Sheathing, Int.)	C	D	D	Unsanded grade.

¹See also paragraphs 4.4 and 4.5.

²A "two sides Natural Finish" item, intended primarily for cabinet work, generally only in $\frac{3}{4}$ in. thickness. Available only from certain mills.

³All inner plies shall consist of C veneer with crossbands jointed.

⁴A "one side Natural Finish" item, intended primarily for paneling and wainscoting, generally only in $\frac{1}{4}$ inch thickness. Available only from certain mills.

⁵See section 11 for definition.

⁶Veneer immediately adjacent to face shall be C or better.

⁷Available touch-sanded when so specified (see section 11 for definition).

Table 2. Exterior Type Grades — Minimum Quality of Veneers

Grade	Face	Back	Inner Plies	Additional Limitations ¹
Marine, Ext. ²	--	--	--	-----
A-A, Ext.	A	A	C	Sanded 2 sides.
A-B, Ext.	A	B	C	Sanded 2 sides.
A-C, Ext.	A	C	C	Sanded 2 sides.
B-B, Ext. (Concrete Form, Ext.)	B	B	C	Edge-sealed and, unless otherwise specified, mill-oiled. Sanded 2 sides.
B-C, Ext.	B	C	C	Sanded 2 sides.
C-C, Ext. (Plugged) ³	C (Plugged) ³	C	C	Sanded 2 sides or touch-sanded ⁴ .
C-C, Ext. (Sheathing, Ext.)	C	C	C	Unsanded grade.

¹See also paragraphs 4.4 and 4.6.

²See section 7, Special Constructions.

³See section 11 for definition.

⁴Available touch-sanded when so specified (see section 11 for definition).

Table 3. Overlaid Plywood — Minimum Quality of Veneer

Grade	Face ¹	Back ¹	Inner Plies
A-A, Ext.—High Density Overlay	A	A	B
B-B, Ext.—High Density Overlay	B	B	B
B-B, Ext.—High Density Concrete Form Overlay	B	B	B
B-B, Ext.—Medium Density Overlay	B	B	C ²

¹For overlaid plywood the grade designation for face or back refers to the veneer directly underlying the surface. All overlaid plywood is surfaced on two sides unless otherwise specified. When only one side is surfaced, the exposed back shall be C or better.

²Medium Density Overlay also available with B grade inner plies.

period of 19 hours with sufficient air circulation in drying cabinet to lower moisture content of specimens to a maximum of 8 percent, based on oven-dry weight. This test procedure shall be conducted through three cycles, unless all specimens have failed.

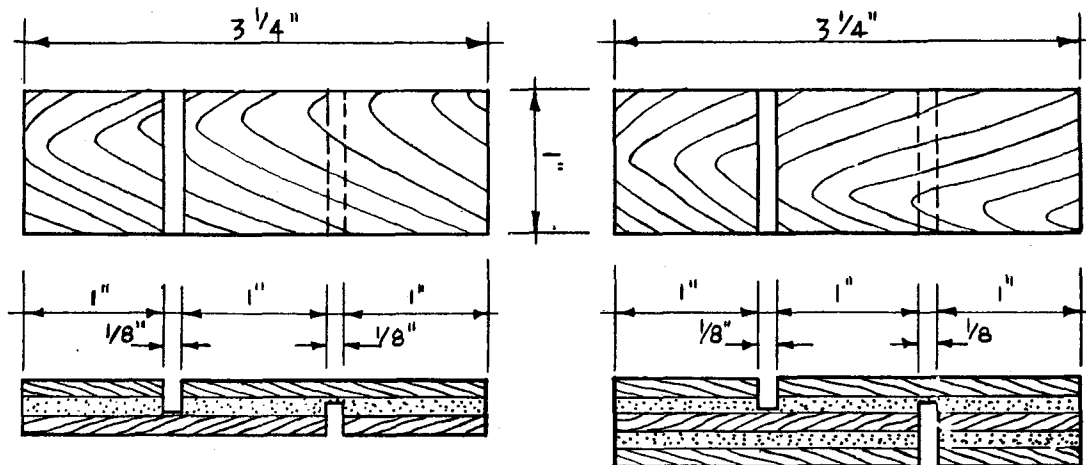
5.3 Test for Exterior Type.

5.3.1 Preparation of Exterior Test Specimens.—Ten shear specimens from each piece, five for cold and five for boil test, shall be cut $3\frac{1}{4}$ inches long and 1 inch wide and kerfed one-third of the length of the specimen from each end, as illustrated in figure 1, so that a 1-inch square test area in the center results. Specimens shall be oriented so that the grain direction of the ply under test runs at a 90° angle to the length of the specimen. Kerfing shall extend two-thirds of the way through the ply under test, and shall not penetrate the next glueline.

If the number of plies exceeds 3, the cuts shall be made so as to test any two of the joints, but the additional plies need not be stripped except

as demanded by the limitations of the width of the retaining jaws on the testing device. When desired, special jaws may be constructed to accommodate the thicker plywood. If the number of plies exceeds 3, the choice of joints to be tested shall be left to the discretion of the inspector, but at least one-half of the tests shall include the innermost joints.

5.3.2 Cold Soaking Test.—The specimens shall be submerged in water at room temperature for a period of 48 hours and dried for 8 hours at a temperature of 145° F. ($\pm 5^\circ$ F.) with sufficient air circulation to lower moisture content of the specimens to a maximum of 8 percent, based on oven dry weight, and then followed by two cycles of soaking for 16 hours and drying for 8 hours under the conditions described above. The shear specimens shall be soaked again for a period of 16 hours and tested while wet in a shear testing device, by placing them in the jaws of the device, to which a load shall be applied until failure. The percent-



NOTE: Orient grain direction across specimen to test inner two joints.

(a) 3-ply Specimen

(b) 5-ply Specimen

Figure 1. Shear Test Specimens



5.3.3 Boiling Test.—Shear specimens shall be taken as described in paragraph 5.3.1, boiled in water for 4 hours, and then dried for 20 hours at a temperature of 145° F. ($\pm 5^\circ$ F.) with sufficient air circulation to lower moisture content of the specimens to a maximum of 8 percent, based on oven dry weight. The shear specimens shall be boiled again for a period of 4 hours, cooled in water, and tested while wet, as described in paragraph 5.3.1. The percentage of wood failure of the specimens shall be estimated, with specimens in a dry condition.

5.3.4 Fire Test.—A 5½-inch by 8-inch test specimen shall be taken from each of five selected panels and shall be placed on the stand as illustrated in figure 2, and subjected to an 800° to 900° C. flame from a Bunsen-type burner for a period of 10 minutes or, in the case of a thin specimen, until a brown char area appears on the back side. The burner shall be equipped with a wing top to envelop the entire width of the specimen in flame.

The flame shall impinge on the face of the specimen 2 inches from the bottom end. After the test, the sample shall be removed from the stand and the gluelines examined for delamination by separating the charred plies with a sharp chisel-like instrument. Any delamination due to combustion shall be considered as failure, except when occurring at a localized defect permitted in the grade. When testing overlaid plywood, blisters or bubbles in the surface caused by combustion shall not be considered delamination.

5.4 Interpretation of Test Results.

5.4.1 Interior Type.—Total continuous visible delamination of $\frac{1}{4}$ inch or more in depth and over 2 inches in length along the edges of a 2 inch by 5 inch test specimen shall be considered as failure. When delamination occurs by reason of a localized defect, other than white pocket, permitted within the grade, that test specimen shall be discarded. Ninety-five percent of all test specimens shall pass the first cycle, and 85 percent of all test specimens shall pass three cycles. If the test specimens fail to meet these requirements, an additional ten panels shall be selected and tested as described in paragraphs 5.1 and 5.2. Then the test specimens from both groups of ten considered together shall meet the above test requirements or all material represented by the samples is considered as failing to comply with this standard.

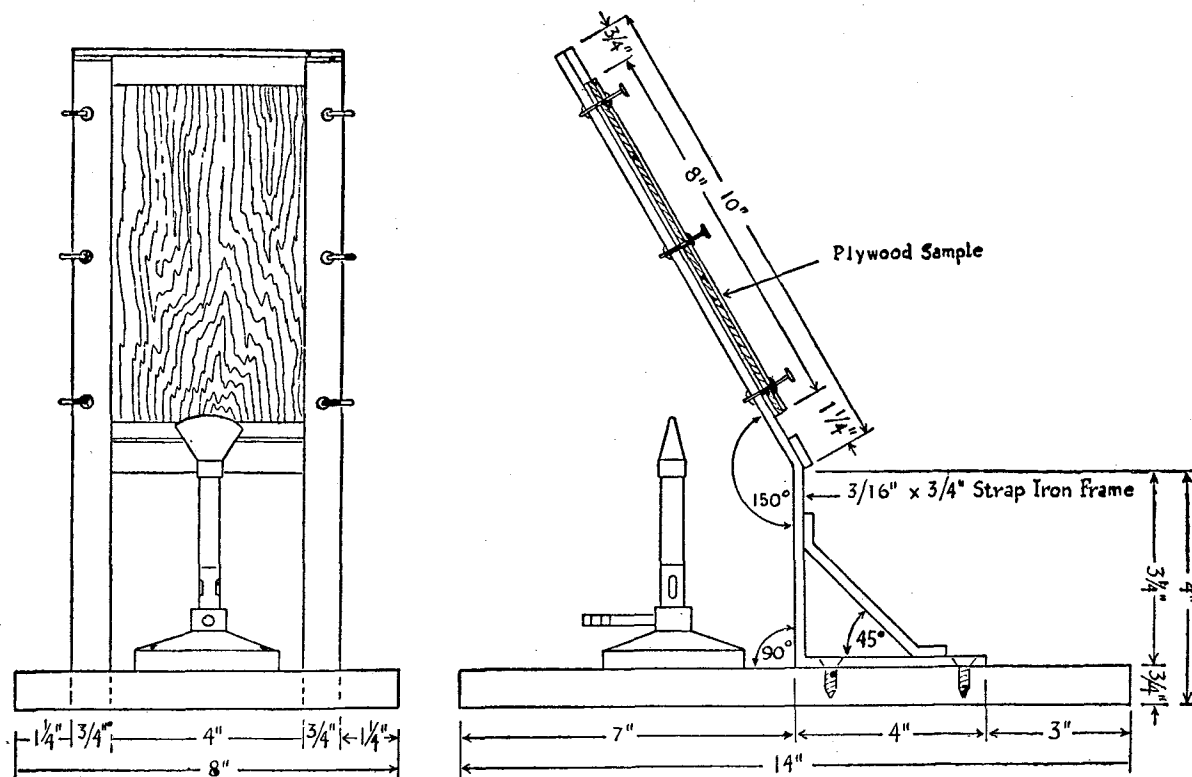


Figure 2. Apparatus for Fire Test.

5.4.2 Exterior Type.—Specimens cut through localized defects permitted in the grade shall be discarded. A piece shall be rated by the combined results of both the cold soaking test and the boiling test—generally ten specimens in all. If the average wood failure of the ten specimens is below 60 percent or if more than one of the specimens is below 30 percent, the piece fails. A test specimen showing any delamination shall be rated at 0 percent wood failure. If more than one piece fails, that panel fails. If one or none of the ten panels fails, all material represented is accepted; if more than two fail, all material represented is rejected. If two fail, another series of ten panels is tested. If one or none of the panels fails in this series, all material represented is accepted; otherwise it is rejected. If the average wood failure of the first ten panels is less than 80 percent, a second series of ten is tested regardless of the number of failures. If the average wood failure of the twenty panels combined is less than 80 percent, all material represented by the samples is considered as failing to comply with this standard.

The same interpretation shall apply to overlaid plywood. In addition, separation of the resin-impregnated face from the plywood shall be considered failure.

If more than one sample panel fails the fire test, all material represented may be rejected; if one panel fails, a second series of five shall be tested, none of which shall fail.

5.5 Scarf Joint Tests.

5.5.1 Strength.—Three test specimens shall be cut at random along each scarf joint from panels selected as directed in paragraph 5.1. Type, grade, and species of the panels shall be recorded. The specimens shall be cut so as to include the joint and shall be prepared as illustrated in figure 3.

Insofar as possible, the joint test area shall contain no localized natural defects permitted within the grade.

At the joint, the thickness and width of plies parallel with the load shall be recorded. Each specimen shall then be placed in the tension grips of a testing machine and loaded continuously at a rate of crosshead travel of 0.035 inch per minute until failure, and the ultimate load recorded. The

ultimate stress in pounds per square inch shall be computed using the ultimate load and area of those plies whose grain is parallel with direction of load. Moisture content of specimens at the time of the testing shall not exceed 16 percent.

The allowable working stress for Douglas fir plywood shall be as given in "Technical Data on Plywood," Section 2, table 4, published by the Douglas Fir Plywood Association, Tacoma 2, Washington, for the appropriate type and grade. If the average ultimate stress of the three test specimens of any one panel is less than twice the allowable working stress in tension for the panel, then that panel fails. If one or none of the ten panels fails, the jointed panels in the shipment are accepted. If more than two fail the jointed panels are rejected. If two fail, another series of ten panels is tested. If one or none of the panels in this series fails, the jointed panels are accepted; otherwise, they are rejected.

5.5.2 Scarf Joint Durability of Interior Type Panels.—Ten test specimens shall be cut at random along each scarf joint from panels selected as directed in paragraph 5.1. Specimens shall be prepared following the general procedure in paragraph 5.1, but in addition, shall be cut so that the scarf joint occurring on one surface of the panel runs across the middle of five specimens and the joint occurring on the opposite surface runs across the middle of the other five specimens.

The specimens shall be subjected to the same test procedure as outlined in paragraph 5.2.

Test specimens showing continuous delamination in excess of $\frac{1}{16}$ inch deep and $\frac{1}{2}$ inch long at the scarf glue line shall be considered as failing. More than one failing specimen in a panel shall constitute failure of that panel. If one or none of the panels fails, the jointed panels in the shipment are accepted. If more than two panels fail, the jointed panels are rejected. If two panels fail an additional ten panels shall be selected and tested, all of which must pass or the jointed panels are rejected; otherwise, they are accepted.

5.5.3 Scarf Joint Durability of Exterior Type Panels.—Ten test specimens shall be cut at random along each scarf joint from panels selected as directed in paragraph 5.1. The specimens shall

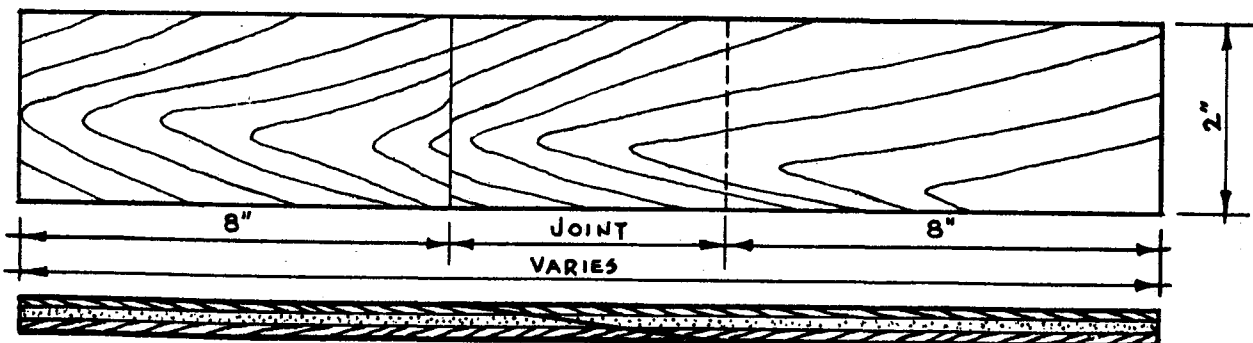


Figure 3. Tension Specimen.

be prepared following the general procedure described in paragraph 5.3.1 but, in addition, shall be cut so that the scarf joint runs through the test specimen as shown in figure 4.

Five specimens shall be subjected to the cold soaking test of paragraph 5.3.2, and five to the boiling test of paragraph 5.3.3.

The panels shall be evaluated as described in paragraph 5.4.2.

6. STANDARD STOCK SIZES

6.1 Douglas fir plywood is commonly made in the sizes listed in tables 4, 5, and 6, but other sizes, including 4-, 14-, and 16-foot lengths, may also be available from mills on order.

6.2 **Scarfed Panels.**—Neither panels with N and A faces, nor the faces of such panels unless longer than 10 feet, shall be scarfed except when specifically so ordered, but other panels may be scarfed. Panels longer than 12 feet are necessarily scarfed.

Scarfed joints shall not have a slope steeper than 1 to 8 but may be specified as less than 1 to 8. Scarfed panel joints shall be glued with a water proof adhesive and shall meet the test requirements for scarf joints set forth in paragraph 5.5.

7. SPECIAL CONSTRUCTIONS

Marine Exterior Grade.

Marine Exterior grade shall be of Exterior type meeting all requirements of this Standard, and of one of the following grades: A-A, A-B, B-B, High Density overlay, or Medium Density overlay, all as modified below for "Marine Exterior" plywood.

Only Coast type Douglas fir or Western larch veneers shall be used.

Veneers: "A" faces⁵ shall be limited to a total of 9 single repairs in a 4-foot by 8-foot sheet, or to a proportionate number in any other size as manufactured.

"B" faces or backs where specified, and all inner plies, shall conform to "B" quality veneer requirements.

All patches shall be glued with an adhesive meeting Exterior type performance requirements of this Standard and, in addition, shall be set in the panel using a technique involving both heat and pressure.

Edge-grain joints: When the face or any ply running parallel with the faces consists of two or more pieces of veneer, the edges shall be jointed straight, square, and tight. When the crossband veneers consist of two or more pieces of veneer, the edges shall be jointed straight and square.

Core-gaps and edge-splits:⁶ Neither edge of a panel shall have any core-gap or edge-split in excess of $\frac{1}{8}$ inch wide. Core-gaps and edge-splits per 8 feet of crossband layer shall not exceed four in number. End-splits and gaps on either end of a panel shall not exceed $\frac{1}{8}$ inch in aggregate width.

Filling of core-gaps and edge-splits with materials such as putty, plastic wood fillers, and the like, or with wood shims, slivers, plugs that serve to conceal the gaps or splits is prohibited.

Decorative Panels.

Specialty panels with decorative face treatments in the form of striations, grooving, embossing,

⁵ When the term faces or face veneers is used, face and back veneers are implied.

⁶ See Sec. 11, Nomenclature and Definitions.

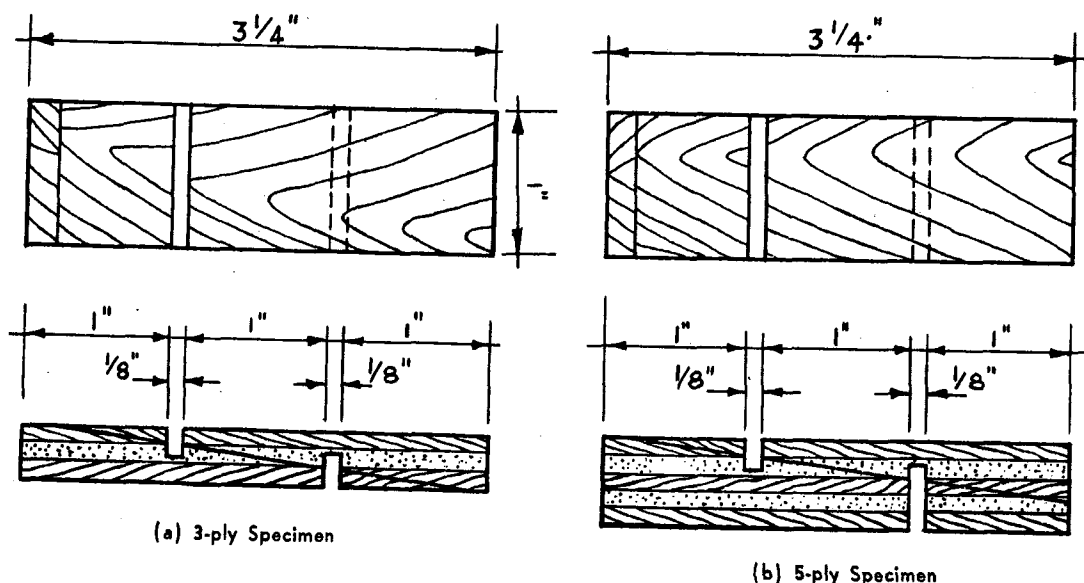


Figure 4. Exterior Durability Specimens.

Table 4. Standard Stock Douglas Fir Plywood Sizes¹ — Interior Type

Grade	Width ² (inch)	Length ² (inch)	Thickness ^{2 3 4 5} (inch)				
N-N, Int.	48	96	---	---	---	---	3/4
N-A, Int.	48	96	---	---	---	---	3/4
N-D, Int.	48	96	1/4	---	---	---	---
A-A, Int.	36	{ 72 96	1/4 1/4	---	---	---	3/4 3/4
A-A, Int.	48 60 ⁶	{ 72 84 96 108 120 144	1/4 1/4 1/4 1/4 1/4 1/4	3/8 3/8 3/8 3/8 3/8 3/8	1/2 1/2 1/2 ---	5/8 5/8 5/8 ---	3/4 3/4 3/4 3/4 3/4 3/4
A-B, Int.	36	96	1/4	3/8	1/2	5/8	3/4
A-B, Int.	48 60 ⁶	{ 72 84 96 108 120 144	1/4 1/4 1/4 1/4 1/4 1/4	3/8 3/8 3/8 ---	1/2 1/2 1/2 ---	5/8 5/8 5/8 ---	3/4 3/4 3/4 3/4 3/4 3/4
A-D, Int.	30	{ 60 72 84 96 120	---	---	---	---	3/4 3/4 3/4 3/4 3/4
A-D, Int.	36	{ 60 72 84 96 120	---	3/8 3/8 3/8 1/4	1/2 1/2 1/2 ---	5/8 5/8 5/8 ---	3/4 3/4 3/4 3/4
A-D, Int.	48 60 ⁶	{ 60 72 84 96 108 120 144	1/4 1/4 1/4 1/4 1/4 1/4 1/4	3/8 3/8 3/8 3/8 3/8 3/8 3/8	1/2 1/2 1/2 1/2 1/2 1/2 1/2	5/8 5/8 5/8 5/8 5/8 5/8 5/8	3/4 3/4 3/4 3/4 3/4 3/4 3/4
B-B (Concrete Form, Int.)	48 60 ⁶	{ 96 60 72 84 96 108 120 144	---	---	---	5/8 5/8 5/8 5/8 5/8 5/8 5/8	3/4 3/4 3/4 3/4 3/4 3/4 3/4
B-B, Int.	48 60 ⁶	{ 96 60 72 84 96 108 120 144	1/4 1/4 1/4 1/4 1/4 1/4 1/4 1/4	3/8 3/8 3/8 3/8 3/8 3/8 3/8 3/8	1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	5/8 5/8 5/8 5/8 5/8 5/8 5/8 5/8	3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4
B-D, Int.	48	84	1/4	3/8	1/2	5/8	3/4
	60 ⁶	96	1/4	3/8	1/2	5/8	3/4
Int. Underlayment	48 60 ⁶	96	1/4	3/8	1/2	5/8	3/4
C-D (Plugged) Int.	48 60 ⁶	96	1/4	3/8	1/2	5/8	3/4
C-D, Int. (Sheathing, Int.) with Exterior Glue (See section 7, Special Constructions)	48	{ 96 120	5/16 5/16	3/8 ---	1/2 ---	5/8 5/8	3/4 ---
	60 ⁶						
C-D, Int. (Sheathing, Int.) unsanded	48	96	5/16	3/8	1/2	5/8	3/4
	60 ⁶	120	5/16	---	---	5/8	---

¹Sizes most commonly available from distributors.

²A tolerance of 1/32 (0.0312) inch over or under the specified width and/or length shall be allowed, but all panels shall be square within 1/8 (0.125) inch. All panels shall be sawn so that a straight line drawn from one corner to the adjacent corner shall fall within 1/16 inch of panel edge.

³A tolerance of 1/64 (0.0156) inch over or under the specified thickness shall be allowed on sanded panels, and a tolerance of 1/32 (0.0312) inch on unsanded panels.

See section 11 for definition of touch-sanding.

⁴Minimum number of plies required for standard construction:

3 plies for 1/4, 5/16, and 3/8 inch.

5 plies for 1/2, 5/8, and 3/4 inch.

7 plies for 7/8 to 1-3/16 inch.

⁵Sanded 2 sides, except Underlayment, C-D (Plugged), C-D Sheathing with Exterior Glue, and C-D Sheathing.

⁶Available from a considerable number of mills, but not all.

NOTE—Any panel furnished in dimensions ordered conforming in all other respects to the various requirements of this standard shall be considered as conforming to this standard. However, panels manufactured to other than standard nominal thicknesses shall be clearly identified on each panel as to the manufactured thickness.

brushing, etc., which, except for the special face treatment, meet all of the requirements of this Standard, including veneer qualities, glue-line performance and workmanship, shall be considered as conforming to the Standard.

C-D Int. (Exterior Glue).

A standard C-D Interior panel, except bonded with an adhesive identical to those for Exterior plywood and meeting the Exterior performance requirements in Section 5.

8. INSPECTION

8.1 All plywood designated as complying with this Commercial Standard shall be subject to inspection in the white only, except that concrete form material may have a priming coat of oil or other clear preparation before inspection.

Note: See Appendix for information on reinspection.

9. MARKING AND CERTIFICATION

9.1 In order to assure the purchaser that he is getting Douglas fir plywood of the grade and quality specified, producers may include with each shipment a Certificate of Inspection which states that the plywood conforms with this Commercial Standard. Each panel so certified shall bear the stamp of any qualified inspection and testing agency which (1) either inspects the manufacture (with adequate sampling, testing of glue-line, and examination for quality of all veneers), or which (2) has tested a random sampling of the finished panels in the shipment being certified for conformity with this Commercial Standard, and which has examined each sample panel for quality of veneer in every ply. All plywood that is grade-trademarked or otherwise designated as being in conformity with this Commercial Standard shall be accompanied by such Certificates of Inspection

Table 5. Standard Stock Douglas Fir Plywood Sizes¹ — Exterior Type

Grade	Width ² (inch)	Length ² (inch)	Thickness ^{3 4 5} (inch)						
			1/4	3/8	1/2	5/8	3/4	7/8	1
Marine, Ext. ^{6, 7}									
A-A, Ext.	48 60 ⁷	60	1/4	3/8	1/2	5/8	3/4	---	---
		84	1/4	3/8	1/2	5/8	3/4	---	---
		96	1/4	3/8	1/2	5/8	3/4	7/8	1
		108	1/4	3/8	1/2	5/8	3/4	---	---
		120	1/4	3/8	1/2	5/8	3/4	---	---
A-B, Ext.	48 60 ⁷	144	1/4	3/8	1/2	5/8	3/4	---	---
		84	1/4	3/8	---	---	3/4	---	---
		96	1/4	3/8	1/2	5/8	3/4	---	1
		120	1/4	3/8	1/2	5/8	3/4	---	---
A-C, Ext.	36	96	1/4	3/8	1/2	5/8	3/4	---	---
A-C, Ext.	48 60 ⁷	72	1/4	3/8	1/2	5/8	3/4	---	---
		84	1/4	3/8	1/2	5/8	3/4	---	---
		96	1/4	3/8	1/2	5/8	3/4	---	1
		108	1/4	3/8	1/2	5/8	3/4	---	---
		120	1/4	3/8	1/2	5/8	3/4	---	---
B-B (Concrete Form, Ext.)	48 60 ⁷	144	1/4	3/8	1/2	5/8	3/4	---	---
		96	---	---	---	5/8	3/4	---	---
B-C, Ext.	48 60 ⁷	96	1/4	3/8	1/2	5/8	3/4	---	---
C-C (Plugged, Ext.)	48 60 ⁷	96	1/4	3/8	1/2	5/8	3/4	---	---
C-C (Sheathing, Ext.)	48 60 ⁷	96	5/16	3/8	1/2	5/8	3/4	---	---

¹Sizes most commonly available from distributors.

²A tolerance of 1/32 (0.0312) inch over or under the specified width and/or length shall be allowed, but all panels shall be square within 1/8 (0.125) inch. All panels shall be sawn so that a straight line drawn from one corner to the adjacent corner shall fall within 1/16 inch of panel edge.

³A tolerance of 1/64 (0.0156) inch over or under the specified thickness shall be allowed on sanded panels, and a tolerance of 1/32 (0.0312) inch on unsanded panels.

See section 11 for definition of touch-sanding.

⁴Minimum number of plies required for standard construction:

3 plies for 1/4, 5/16, and 3/8-inch.

5 plies for 1/2, 5/8, and 3/4 inch.

7 plies for 7/8, to 1-3/16-inch.

⁵Sanded 2 sides, except C-C Plugged and C-C Sheathing.

⁶See section 7, Special Constructions.

⁷Available from a considerable number of mills, but not all.

NOTE—Any panel furnished in dimensions ordered conforming in all other respects to the various requirements of this standard shall be considered as conforming to this standard. However, panels manufactured to other than standard nominal thicknesses shall be clearly identified on each panel as to the manufactured thickness.

and applicable trademarks or grademarks of such inspection and testing agency as outlined above.

9.1.1 A qualified inspection and testing agency is defined to be one that (1) has facilities and personnel to do the inspection and testing as above described, (2) which has no financial interest in any company manufacturing any portion of the product inspected and tested, and (3) which is not owned, operated, or controlled by any such company.

9.2 No reference shall be made to this standard in the certification or trademarking or grademarking of panels not conforming to all provisions of the standard, except that where species of inner plies is other than as provided under paragraphs 4.5 and 4.6, conformance to the standard may be indicated, providing the exception is clearly and legibly noted on trademarks or grademarks.

10. METHOD OF ORDERING

10.1 The regular method of specifying size and grade of plywood is to name the species ("Douglas fir", "Western larch", or "Douglas fir or Western larch"), the number of plies, width, length, grade, type, finished thickness, and whether sanded or unsanded.

10.2 Width always refers to the distance across the grain of the face plies; length refers to the distance along the grain. Width should always be specified first.

10.3 If, for example, the requirement is 100 pieces of plywood $\frac{1}{4}$ inch thick, 48 inches wide, and 96 inches long, for interior applications, one

side of which is to be nailed against a wall where it will not show, but the other side to be exposed to view and painted, this material should be ordered as follows:

Douglas fir plywood: 100 pieces, 3-ply, 48 inches by 96 inches, Interior type, A-D grade. Sanded 2 sides to $\frac{1}{4}$ inch thickness.

10.4 For most uses, sanded panels are desirable, but there are occasional uses where unsanded panels of an A-D or other grade are satisfactory. Such panels should be specified unsanded.

10.5 For special types of service, special features may be desirable in plywood panels, such as omission of oiling for concrete form panels, extra-thick faces for certain architectural treatments. In such cases, the special treatment or feature should be stated after the standard specification. For example, if special features are desired in an Exterior type A-A panel of $\frac{3}{8}$ inch thickness, the order should read:

Douglas fir plywood: 100 pieces, 3-ply, 48 inches by 96 inches, Exterior type, A-A grade. Sanded 2 sides to $\frac{3}{8}$ inch thickness. (Add further special requirements.)

10.6 When ordering overlaid plywood, "High Density Overlay," "Medium Density Overlay," or "Overlaid Plywood Concrete Form" should be specified. The number of pieces, size, and thickness are noted in the same way as for other kinds of plywood. Special requirements, such as "High Density A-A," "Medium Density, B Inner Plies," "Surfaced 1 side only," or special weights of sur-

Table 6. Standard Stock Douglas Fir Plywood Sizes¹ — Overlaid Plywood

Grade	Width ² (inch)	Length ² (inch)	Thickness ³ (inch)
A-A High Density, Ext.	48	96	$\left\{ \begin{array}{l} 5/16 \text{ (3-ply)}^4 \\ 3/8 \text{ (3-ply)} \\ 1/2 \text{ (5-ply)} \\ 9/16 \text{ (5-ply)} \\ 5/8 \text{ (5-ply)} \\ 3/4 \text{ (5-ply)} \\ 7/8 \text{ (7-ply)} \\ 1 \text{ (7-ply)} \\ 1-1/8 \text{ (7-ply)} \end{array} \right.$
B-B High Density, Ext.	48	96	Same as for grade A-A, above.
B-B High Density, Ext. (Concrete Form)	48	96	$\left\{ \begin{array}{l} 1/2 \text{ (5-ply)} \\ 9/16 \text{ (5-ply)} \\ 5/8 \text{ (5-ply)} \\ 3/4 \text{ (5-ply)} \end{array} \right.$
B-B Medium Density, Ext.	48	96	Same as for grade A-A, above.

¹Sizes most commonly available from distributors.

²A tolerance of $1/32$ (0.0312) inch over or under the specified width and/or length shall be allowed, but all overlaid panels shall be square within $1/8$ (0.125) inch. All panels shall be sawn so that a straight line drawn from one corner to the adjacent corner shall fall within $1/16$ inch of panel edge.

³A tolerance of $1/32$ (0.0312) inch over or under the specified thickness shall be allowed on overlaid panels.

⁴Number of plies refers to veneers. Resin-impregnated surfaces are not included.

NOTE—Any panel furnished in dimensions ordered conforming in all other respects to the various requirements of this standard shall be considered as conforming to this standard. However, panels manufactured to other than standard nominal thicknesses shall be clearly identified on each panel as to the manufactured thickness.

facing material, should be stated after the standard specification.

11. NOMENCLATURE AND DEFINITIONS

Back.—The side reverse to the face of the panel.

Borer Holes.—Voids made by wood-boring insects or worms.

Centers.—Inner plies running parallel to the panel face.

Check.—A partial separation of veneer fibers, usually small and shallow, running parallel to the grain of the wood, and caused chiefly by strains produced in seasoning.

Core Gaps.—Rectangular or square openings, extending through or partially through a panel, which occur where the adjacent inner ply veneers have separated at an edge joint.

Cores.—Inner plies running perpendicular to the panel face.

Crossbanding.—Same as core.

Defects, Open.—Open checks, open splits, open joints, open cracks, loose knots, and other defects interrupting the smooth continuity of the panel surface.

Edge Splits.—Wedge-shaped openings in the inner plies caused by splitting of the veneer during handling or pressing.

Exterior Type.—Refers to the type of plywood intended for outdoor or marine uses. This type is bonded with adhesives, affording the ultimate in water and moisture resistance. (See pars. 4.4 and 4.6.) There are several grades within this type.

Face.—The better side of a panel in any grade calling for a face and a back; also, either side of a panel where the grading rules draw no distinction between faces. The quality of the face and back determines the grade of a panel within either the Exterior or Interior type.

Heartwood.—The darker-colored wood occurring in the inner portion of the tree sometimes referred to as "heart."

Interior Type.—Refers to the type of plywood intended for inside uses and for construction applications where subjected to occasional wetting or deposits of moisture. (See pars. 4.4 and 4.5.) There are several grades within this type.

Knot.—Cross section of a branch or limb whose grain usually runs at right angles to that of the piece in which it is found.

Knotholes.—Voids produced by the dropping of knots from the wood in which they are originally embedded.

Lap.—A condition where the veneers are so misplaced that one piece overlaps the other rather than making a smooth butt joint.

Patches.—Insertions of sound wood in veneers or panels for replacing defects. Boat patches shall be oval-shaped but sides shall taper each direction to a point or to a small rounded end; in A faces the rounded ends shall have a radius not exceeding $\frac{1}{8}$ inch. Router patches shall have parallel sides

and rounded ends. Sled patches shall be rectangular with feathered ends.

Pitch Pocket.—A well-defined opening between rings of annual growth, usually containing, or which has contained, pitch, either solid, or liquid.

Pitch Streak.—A well-defined accumulation of pitch in a more or less regular streak.

Plugged.—Relates to a face in Int. Underlayment, C-D Plugged and C-C Plugged grades. Such faces may contain knotholes, worm and borer holes, and other open defects not larger than $\frac{1}{4}$ inch by $\frac{1}{2}$ inch, sound and tight knots up to $1\frac{1}{2}$ inches in least dimension, splits up to $\frac{1}{8}$ inch wide, ruptured and torn grain, pitch pockets if solid and tight, plugs, patches, and shims.

Plugs.—Sound wood of various shapes including, among others, circular, dogbone, and leaf shapes, for replacing defective portions. Plugs usually are held in veneer by friction only until veneers are bonded into plywood; also synthetic plugs of fiber and resin aggregate; used to fill openings and provide a smooth, level, durable surface.

Repair.—Any patch, plug, or shim.

Sapwood.—The lighter-colored wood occurring in the outer portion of the tree, sometimes referred to as "sap."

Shim.—A long, narrow repair not more than $\frac{3}{16}$ inch wide.

Shop Cutting Panel.—Panels which have been rejected as not conforming to grade requirements of standard grades in this Commercial Standard. Identification of these panels shall include the notation "for remanufacture only." Blistered panels are not considered as coming within the category covered by this stamp.

Solid Core.—Inner ply construction of solid B-veneer pieces. No special limitation on core gaps is implied.

Split.—Complete separation of veneer fibers parallel to grain, caused chiefly by manufacturing process or handling.

Streaks.—See "Pitch streak."

Struc.-Int.—

The FHA Minimum Property Standards, FHA No. 300, Nov. 1, 1958, and revisions, require for many construction applications that panels be identified as Exterior or Structural-Interior. Both must conform to all provisions of the appropriate Commercial Standard, and Structural-Interior must meet the following requirements:

Glue shall have resistance to temperature up to 160° F. at least equal to that of plain protein glue. Urea resin glues shall not be used in this type unless evidence is submitted indicating performance equivalent to that of plain protein glue.

Glue shall have resistance to mold at least equal to that of plain protein glue to which 5 pounds of pentachlorophenol have been added per 100 pounds of dry glue base.

Torn Grain.—A marked leafing or separation on veneer surface between spring and summer wood.

Touch-Sanding.—A sizing operation consisting of a light sanding in a standard sander. Sander skips are admissible. Where rough panels are specified to be "touch-sanded," the thickness tolerance of each piece shall be plus or minus $\frac{1}{32}$ (0.0312) inch of the nominal thickness specified.

Veneer.—Thin sheets of wood.

White Pocket:

Light white pocket.—Advanced beyond incipient or stain stage to point where pockets are present and plainly visible, mostly small and filled with white cellulose; generally distributed with no heavy concentrations; pockets for the most part separate and distinct; few to no holes through the veneer.

Heavy white pocket.—May contain a great number of pockets, in dense concentrations, running together and at times appearing continuous; holes may extend through the veneer but wood between pockets appears firm. At any cross section extending across the width of the affected area, sufficient wood fiber shall be present to develop not less than 40 percent of the strength of clear veneer. Brown cubicle and similar forms of decay which have caused the wood to crumble are prohibited.

60/60, 65/65, 93/93, etc.—Such optional symbols may be used by manufacturers of overlaid plywood to indicate the weight of the overlay in pounds per 1,000 square feet on each side of the panel. The weight of the overlay includes resin and carrier sheet (or sheets) together, before pressing.

APPENDIX

The following material based on industry practices, is offered for the information of purchasers of Douglas fir plywood:

All complaints regarding the quality of any shipment must be made within 15 days from receipt thereof.

If the grade of any plywood shipment is in dispute and a reinspection is demanded, the cost of such reinspection shall be borne by the seller and the shipment settled for on the basis of the reinspection report if the shipment is more than 5 percent below grade.

The buyer need not accept those panels established as below grade, but shall accept the balance of the shipment as invoiced.

If reinspection establishes the shipment to be 5 percent or less below grade the buyer pays the cost of reinspection and pays for the shipment as invoiced.

HISTORY OF PROJECT

First edition.—Pursuant to a request from the manufacturers of Douglas fir plywood, a general conference of manufacturers, distributors, and users of this product was held in Tacoma, Washington, on August 17, 1932, to consider the adoption of standard grading rules for the guidance of the industry. Manufacturers representing approximately 80 percent of the production of Douglas fir plywood were in attendance, as well as others interested in the distribution and use of the product. The standard tentatively drafted by a committee of manufacturers was thoroughly

discussed and several constructive changes were made. Following written acceptance by a satisfactory majority of the industry, the standard was promulgated as CS45-33, effective February 15, 1933.

First revision.—The Standing Committee, as a result of an industry conference held in Tacoma, Washington, on August 3, 1936, recommended some modifications in the standard. A recommended revision was circulated on September 11, 1936, for written acceptance, with the result that the revised standard was accepted and authorized by the industry for promulgation as Commercial Standard CS45-36, effective November 1, 1936.

Second revision.—Pursuant to a suggestion by the Federal Housing Administration, and following several conferences between representatives of the Forest Products Laboratory, the FHA, and the plywood manufacturers, a second revision of the Standard was proposed. This revision provided for two classes of moisture resistance and changes in the sheathing grade. Upon approval by the Standing Committee, the revision was circulated to the trade for acceptance on September 16, 1938. Later, the establishment of the revision as Commercial Standard CS45-38, effective for new production November 10, 1938, was announced.

Third revision.—General demand for the various grades of Douglas fir plywood for permanent exterior use led to a proposal by the Douglas Fir Plywood Association to include in the standard, detail requirements for seven distinct grades of the Exterior type. Upon approval by the Standing Committee the recommended revision was submitted on May 7, 1940, to the trade for consideration, and an announcement of its acceptance was issued on July 20. The revised standard, designated Commercial Standard CS45-40, became effective for new production August 20, 1940.

Fourth revision.—Pursuant to a request from the Douglas Fir Plywood Association on May 27, 1942, and following approval by the Standing Committee, the fourth revision was circulated on July 2, 1942, to the trade for acceptance. The purpose of this revision was to make adjustments in the moisture-resistant type so as to speed up the production of those grades and sizes essential for defense construction. The major changes were the elimination of the grades "good 2 sides" and "good 1 side," the addition of a new grade, "sound 1 side," and a considerable reduction in the number of standard panel sizes. This revision superseded both CS45-40 (Domestic Grades) and CS45E-36 (Export Grades), since Douglas fir plywood was then being graded on the same basis whether for domestic or export purposes. Acceptance of the revision and its establishment as Commercial Standard CS45-42, was announced on October 30, 1942. The revised standard became effective for new production November 16, 1942.

Fifth revision.—The experience gained by our armed forces in the use of plywood for various

marine applications led to the development of an improved grade for such use. On June 22, 1944, the Douglas Fir Plywood Association submitted a proposed revision of the standard, which was unanimously approved by the Standing Committee. On July 31, 1944, the recommended revision was circulated to the trade for acceptance, and on December 27, the establishment of the revision as Commercial Standard CS45-45, effective January 27, 1945, was announced.

Sixth revision.—On April 14, 1947, the Douglas Fir Plywood Association submitted a proposed revision in which the major changes were a reduction in the number of grades; renaming moisture-resistant type as Interior type; permitting the use of Western hemlock, Sitka spruce, Noble fir, and other western softwood species in the inner plies of sound 2 sides, sound 1 side, industrial, and door panel grades in the Interior type only; increasing the number of cycles of the bondage test for the Interior type from 2 to an average of 10; and including a fire test for Exterior type bondage. These changes were approved by the Standing Committee, and the recommended revision was circulated on June 5, 1947, to those directly concerned for acceptance. An announcement of the establishment of the revision as CS45-47 was issued on August 15, 1947.

Seventh revision.—The Douglas Fir Plywood Association, on May 21, 1948, submitted a proposed revision of the Standard in an improved and simpler form. After approval by the Standing Committee, the recommended revision was circulated to the trade for consideration on August 5, 1948. This revision gave the requirements for the four basic standard grades of veneer, and the plywood grades as made up from these veneers were covered in tables. The bondage requirements for both the Interior and Exterior types were made more rigid, thus insuring greater durability of the product. The establishment of the revision as Commercial Standard CS45-48 was announced on October 1, 1948.

Eighth revision.—The Douglas Fir Plywood Association, on March 12, 1954, submitted a revision of CS45-48 prepared by a technical committee of the association and adjusted after having been circulated several times to the industry for advance consideration.

The principal changes consisted of: (1) Provisions for overlaid plywood, two "natural finish" panels, and an Underlayment grade; (2) requirements that exposed veneer shall have the bark side out, that tape in the glue line be prohibited, and that moisture content of panels shall not exceed 18 percent at time of shipment; (3) a ring count limitation for face grades, limitation of defects in grade A faces, modification in grade B veneer, and requirements of a 5 percent mold inhibitor in the adhesive used in some Interior grades; (4) adjustment of the tables of standard stock sizes to eliminate odd sizes but to include those sizes nor-

mally carried in stock by jobbers and wholesalers; (5) a new requirement for assuring straight edges on finished panels; and (6) modification of several definitions to clarify present misunderstandings, and addition of a definition for "shop-cutting panel."

After approval of the recommended revision by the Standing Committee, it was circulated to the trade for consideration on October 1, 1954, and was subsequently accepted by a satisfactory majority of the entire industry. On January 3, 1955, the establishment of the revision as Commercial Standard CS45-55, effective February 1, 1955, was announced.

Ninth revision.—The draft of a proposed revision of CS45-55 was reviewed by all segments of the industry in December 1959. On February 5, 1960, the Douglas Fir Plywood Association submitted an adjusted draft of the proposed revision for consideration by the Standing Committee. The recommended revision, was circulated to the industry for acceptance on June 24, 1960, following adjustment which reflected the views of the Committee.

Acceptances received were considered to be sufficiently representative to insure successful application of the revision and on October 26, 1960, an announcement was issued establishing the revised standard as Commercial Standard CS45-60, effective November 14, 1960.

The principal changes involve: (1) Inclusion of Western Larch, scarfed panels, marine exterior grade, and decorative panels, as well as more rigid test requirements; (2) deletion of grade trade-marking.

Project Manager: H. A. Bonnet, Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce.

STANDING COMMITTEE

The function of the Standing Committee is to review, prior to circulation for acceptance, changes proposed to keep the standard abreast of progress. Comments concerning the standard and suggestions for revision may be addressed to the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, which acts as secretary for the Committee, or to any of its members listed below:

Arnold Koutonen, Manager, St. Paul & Tacoma Lumber Co., Olympia, Wash. (Chairman)
Richard Adams, Nordic Plywood Inc., Sutherlin, Ore.
R. W. Jacob, President, John Bader Lumber Co., 2020 Clybourn Ave., Chicago 14, Ill.
Larry Lundquist, International Paper Co., Longview, Wash.
W. T. McHugh, Assistant to the President, Pittsburgh Testing Laboratory, Stevenson and Locust Sts., Pittsburgh 19, Pa.
Nelson S. Perkins, Douglas Fir Plywood Association, Fuller Bldg., 1119 A St., Tacoma 2, Wash.
J. A. Reidelbach, Home Manufacturers' Association, 910 17th St., N.W., Washington 6, D.C.
L. A. Patrosky, Timber Engineering Co., P.O. Box 826, Corvallis, Ore.

Louis G. Riecke, Tulane Hardwood Lumber Co., P.O. Box 7008, Station G., New Orleans, La.
 William A. Russell, Structural Engineer, Technical Standards, Federal Housing Administration, Washington 25, D.C. (Non Voting Observer)
 Milton Smithman, Assistant Director, National Association of Home Builders, National Housing Center, 1625 L St., N.W., Washington 6, D.C.

ACCEPTORS

The manufacturers, distributors, users and others listed below have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the standard as far as practicable but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the standard, and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the standard may be identified as such by a certificate, grade mark, or label. Purchasers are encouraged to require such specific evidence of compliance, which may be given by the manufacturer whether or not he is an acceptor.

ASSOCIATIONS (General Support)

Carolina Lumber & Building Supply Association, Charlotte, N.C.
 Douglas Fir Plywood Association, Tacoma, Wash.
 Home Manufacturers' Association, Washington, D.C.
 National Woodwork Manufacturers Association, Inc., Chicago, Ill.
 Southern Sash & Door Jobbers Association, Memphis, Tenn.

FIRMS AND OTHER INTERESTS

Aberdeen Plywood & Veneers, Inc., Aberdeen, Wash.
 Acme Stone & Lumber Co., Minneapolis, Minn.
 Acme Wholesale Co., Phoenix, Ariz.
 Adair, Joseph A., Lumber Co., Portland, Ore.
 Adams Plywood Co., Fresno, Calif.
 Aetna Plywood & Veneer Co., Chicago, Ill.
 Aetna Plywood & Veneer Co., Indianapolis, Ind.
 Algoma Plywood & Veneer Co., Division of U.S. Plywood Corp., Algoma, Wis.
 Allen, Edmund A., Lumber Co., Chicago, Ill.
 Allen Millwork Manufacturing Corp., Shreveport, La.
 American Distributing Co., Modesto, Calif.
 American Sash & Door Co., Kansas City, Mo.
 Anacortes Veneer, Inc., Anacortes, Wash.
 Andrews, C. E., Lumber Co., New Bethlehem, Pa.
 Annandale Millwork Corp., Annandale, Va.
 Arizona Millwork Co., Phoenix, Ariz.
 Atkinson, W. E., Co., Newburyport, Mass.
 Atlas Wholesale Lumber Co., Pittsburgh, Pa.
 Axinn & Sons Lumber Co., Inc., Northport, Long Island, N.Y.

Bacon Lumber Co., Inc., Lafayette, La.
 Barcus Lumber Co., Urbana, Ill. (General Support)
 Barger Millwork Co., Statesville, N.C.
 Barnes, W. F. & J. F., Lumber Co., Waco, Tex.
 Baxter, C. B. & Co., Kansas City, Mo.
 Belmont Lumber Co., Belmont, N.C.
 Beltsville Lumber Co., Beltsville, Md.
 Bennett, N. C., Lumber Co., Minneapolis, Minn.
 Beverstock, W. H., Inc., Waterloo, Iowa.
 Binswanger Glass Co., Richmond, Va.
 Blanchard Lumber Co., Portland, Ore.
 Blick, T. C., Plywood Co., Inc., East Hartford, Conn.
 Bohemia Lumber Co., Inc., Culp Creek, Ore.
 Boise Cascade Corp., Valselt Division, Valselt, Ore.
 Borden Chemical Co., The, Seattle, Wash.
 Boyd, G. Morley, Wholesale Lumber, Saginaw, Mich.
 Bradford-Kennedy Co., Omaha, Nebr.
 Brandywine Millwork & Plywood Co., Stanton, Del.
 Britton & Stone Lumber Co., Inc., West Hartford, Conn.
 Brookings Plywood Corp., Brookings, Ore.
 Brownlee Co., The, Detroit, Mich.
 Bruett, T. A., Lumber, Inc., Milwaukee, Wis.
 Buell & Co., Dallas, Tex.
 Buffelen Sales Co., Tacoma, Wash.

Buffelen Woodworking Co., Tacoma, Wash.
 Build 'N Save, Lakewood, Calif.
 Builders Materials Co., Springfield, Mo.
 Builders Supply Company of Petersburg, Inc., Petersburg, Va.
 Builders' Square, Culver City, Calif.
 Building Materials Co., Phoenix, Ariz.
 Building Products Co., Portland, Ore.
 Burton-Rodgers, Inc., Tulsa, Okla.
 Butz Lumber Co., Wilmington, Del.
 Byers Lumber Co., Hastings, Nebr.

California Panel & Veneer Co., Los Angeles, Calif.
 Cameron, William, & Co., Wholesale, Waco, Tex.
 Cape Fear Supply Co., Fayetteville, N.C.
 Capesius, V. M., Civil Engineers, San Diego, Calif.
 Carl Besch Co., Inc., The, Mount Kisco, N.Y.
 Carlow Co., Los Angeles, Van Nuys, Colton, and Los Angeles, Calif.
 Cascade Machine Works, Plywood Division, Somers, Mont.
 Cascades Plywood Corp., Lebanon, Ore.
 Central Building Supply, Inc., Baltimore, Md.
 Central City Lumber Co., Jackson, Mich.
 Central Florida Lumber & Supply Co., Orlando, Fla.
 Central States Plywoods, Inc., Chicago, Ill.
 Centralia Plywood, Inc., Centralia, Wash.
 Champin Co., The, Hartford, Conn.
 Chicago, Rock Island & Pacific Railroad Co., Chicago, Ill.
 Chris Choate, Architect, Los Angeles, Calif.
 Cincinnati Butchers' Supply Co., The, Cincinnati, Ohio.
 City Lumber Co., Inc., Knoxville, Tenn.
 Clarke, H. B., Lumber Co., Muncie, Ind.
 Clear Fir Sales Co., Springfield, Ore.
 Clifford & Clifford, Cambridge, Ill.
 Columbia Veneer Co., Seattle, Wash.
 Conrad & Cummings, Binghamton, N.Y.
 Coos Bay Timber Co., Coos Bay, Ore.
 Coos Bay Timber Co., Coquille, Ore.
 Coos Head Timber Co., Coos Bay, Ore.
 Coquille Valley Lumber Co., Milwaukie, Ore.
 Cotton Hanlon, Inc. (Wholesale Div.), Odessa, N.Y.
 Crane & Clark Lumber Corp., Maspeth, N.Y.
 Cromar Lumber Co., Salt Lake City, Utah.
 Cushing, James R., Architect, Topeka, Kans.

Dahlquist, Henry, Sales Co., Birmingham, Mich.
 Daniel Buck, Inc., Philadelphia, Pa.
 Daugherty Lumber Co., Cottage Grove, Ore.
 Dealers Service & Supply Co., St. Louis, Mo.
 Dealers Warehouse Co., Newton, Iowa.
 Dealers Warehouse Supply Co., Inc., Baltimore, Md.
 Dealers Wholesale Supply, Inc., Detroit, Mich.
 de Haan, R., Wholesale Lumber, Libertyville, Ill.
 Denver Lumber Co., Inc., The, Denver, Colo.
 Detroit, City of, Department of Public Works, Detroit, Mich.
 Detroit Edison Co., The, Detroit, Mich.
 Diamond Hill Plywood Co., Darlington, S.C., Knoxville and Nashville, Tenn., Greensboro, N.C., Norfolk and Richmond, Va.
 Diamond National Corp., Biddeford, Maine.
 Dickenson Lumber Co., La Habra, Calif.
 District of Columbia, Department of Highways and Traffic, Washington, D.C.
 Dixie Plywood Company of Tampa, Inc., Tampa, Fla.
 Donover Co., Inc., Montebello, Calif.
 Downes Lumber Co., Boston, Mass.
 Drain Plywood Co., Drain, Ore.
 Dulaney Plywood Corp., Louisville, Ky.
 Duncan Lumber Co., Inc., Seattle, Wash.
 Durable Plywood Co., Arcata, Calif.
 Durez Plastics Division, Hooker Chemical Corp., North Tonawanda, N.Y.
 Dwyer Lumber & Plywood Co., Portland, Ore.

Edward Hines Lumber Co., Chicago, Ill.
 Ehrlich-Harrison Co., Seattle, Wash.
 Elma Plywood Corp., Elma, Wash.
 Empire Lumber Co., Grandville, Mich.
 Empire Lumber Corp., New York, N.Y.
 Equity Lumber Co., The, Painesville, Ohio.
 Eugene Plywood Co., Eugene, Ore.
 Evans Products Co., Coos Bay, Ore.
 Evansville Sash & Door Co., Inc., Evansville, Ind.
 Everett Plywood & Door Corp., Everett, Wash.
 Exchange Sawmills Sales Co., Kansas City, Mo.

Falls Dealer Supply Co., Sheboygan Falls, Wis.
 Fellows Sales Co., Omaha, Nebr.
 Fingerle Lumber Co., Wholesale Division, Ann Arbor, Mich.
 Finley Lumber Co., Norristown, Pa.
 Fischer Lime & Cement Co., Memphis, Tenn.
 Fitzpatrick, J. J., Lumber Co., Inc., Madison, Wis.
 Flannagan, Eric G., & Sons, Henderson, N.C.
 Florida Lumber & Plywood Service, Inc., Miami, Fla.
 Fort Smith Sash & Door Inc., Fort Smith, Ark.
 Fort Vancouver Plywoods Co., Vancouver, Wash.
 Four States Supply Co., Carthage, Mo.
 Foxworth-Galbraith Lumber Co., Dallas, Tex.
 Frank Paxton Lumber Co., Kansas City, Mo., Denver, Colo.
 Fort Worth, Tex., Chicago, Ill., Albuquerque, N. Mex., and Milwaukee, Wis.
 Franks & Sons, Inc., Lisbon, Iowa.
 Frost Hardwood Lumber Co., San Diego, Calif.
 Furman Lumber, Inc., Boston, Mass.

Galbraith Steel & Supply Co., Dallas, Tex.
 Gerner & Green Lumber Co., San Francisco, Calif.
 Gates Lumber Co., Janesville, Wis.
 Georgia-Pacific Corp., Portland, Oreg.
 Gerner, R. A., Lumber & Wood Products, Youngstown, Ohio.
 Gerrity Co., Inc., Albany, N.Y.
 Gibson Door Co., Inc., The, Utica, N.Y.
 Gillespie, D. L., & Associates, Concord, Mass.
 Gillon Lumber Co., San Francisco, Calif.
 Gittings Lumber Co., Inc., Denver, Colo.
 Glustina Veneer Co., Eugene, Oreg.
 Glenwood Lumber Co., Inc., The, Bridgeport, Conn.
 Gordon, F. A. & Co., Elizabeth, N.J.
 Goshen Sash & Door Co., Goshen, Ind.
 Grants Pass Plywood Inc., Grants Pass, Oreg.
 Gueydan Lumber & Plywood, Inc., Metairie, La.
 Gulf States Plywood Co., New Orleans, La.

H & S Lumber Co., Charlotte, N.C.
 Haley Wholesale Co., Inc., Santa Barbara, Calif.
 Hampton Lumber & Supply Co., St. Louis, Mo.
 Hansen Wholesale Lumber Corp., Detroit, Mich.
 Harbor Sales Co., Inc., The, Baltimore, Md.
 Hardeel Mutual Plywood Corp., Olympia, Wash.
 Harnischfeger Homes, Inc., Port Washington, Wis.
 Hast Lumber Co., Denver, Colo.
 Hawaii Builders Supply Co. Ltd., Honolulu, Hawaii.
 Henrich Plywood Co., Inc., Buffalo, N.Y.
 Hermsdorf Fixture Manufacturing Co., Inc., Manchester, N. H.
 Hincley Lumber Co., Hincley, Ill.
 Hoffman Supply Co., Inc., The, Lewistown, Pa.
 Houston Lumber Co., Wichita, Kans.
 Houston Sash & Door Co., Houston, Tex.
 Hult Plywood Co., Junction City, Oreg.
 Huttig Sash & Door Co., St. Louis, Mo.
 Huttig Sash & Door Co., Inc., Knoxville, Tenn.

Idaho Veneer Co., Post Falls, Idaho.
 Independent Millwork, Inc., Minneapolis, Minn.
 Inglewood Lumber Co., Inglewood, Calif.
 Intermountain Lumber Co., Salt Lake City, Utah.
 International Paper Co., Long-Bell Division, Longview, Wash.
 Interstate Container Corp., Red Bluff, Calif.
 Interstate Wholesale, Inc., Fort Madison, Iowa.

James River Lumber Co., Inc., Richmond, Va.
 Jefferson Plywood Co., Madras, Oreg.
 Johnson Cashway Lumber Co., Minneapolis, Minn.
 Jones Lumber & Hardware Co., Inc., Memphis, Tenn.
 Jones Veneer & Plywood Co., Eugene, Oreg.
 Jo Ondr and Son Plywoods, Inc., St. Louis, Mo.

Kane & Fairchild, Architects, Hartford, Conn.
 Kellogg Lumber Co., Denver, Colo.
 Killam, O. P., & Son, Winchendon Springs, Mass.
 King, Benioff & Associates, Sherman Oaks, Calif.
 King Bros. Wholesale Co., Inc., Dunkirk, N.Y.
 Klamath Hardwoods, Inc., Klamath Falls, Oreg.
 Krone & Co., Inc., Lima, Ohio.
 Kullberg Manufacturing Co., Minneapolis, Minn.
 KV Lumber Sales, Denver, Colo.
 Lacey Plywood Co., Inc., Lacey, Wash.
 Lake & Nebel Lumber Sales, St. Louis, Mo.
 Lampert Lumber Co., St. Paul, Minn.
 Lane Plywood Inc., Eugene, Oreg.
 Lank Woodwork Co., Inc., Washington, D.C.
 Law Law Potter & Nystrom, Madison, Wis.
 Lawrence Supply Corp., Richmond, Va.
 Lerner Plywood Co., Detroit, Mich.
 Lester's, Inc., Lester Prairie, Minn.
 Lewis Lumber Co., Birmingham, Ala.
 Lewis, Palmer G. Co., Inc., Seattle, Wash.
 Lord & Bushnell Lumber Co., Chicago, Ill.
 Lloyd St. Clair Lumber Co., Kansas City, Mo.
 Lumber & Millwork Company of Philadelphia, The, Philadelphia, Pa.
 Lumbermens Merchandising Corp., Wayne, Pa.
 Lumber Products, Portland, Oreg.
 Lumber Products, Inc., Metairie, La.
 Lumber Supply, Inc., Cedar Rapids, Iowa.
 Lund Plywood & Manufacturing Co., Crescent City, Calif.
 Lyman Felheim Co., Erie, Pa.

Mackemer & McBroom Lumber Co., Watseka, Ill.
 Mackintosh & Truman, Inc., Seattle, Wash.
 Macomb Wholesale Lumber Co., Mount Clemens, Mich.
 M & D Building Products, Inc., Minneapolis, Minn.
 Magee-Fine Lumber Co., Irvington, N.J.
 Mahoney Sash & Door Co., Canton, Ohio.
 Mark Clemmer Lumber Co., Amarillo, Tex.
 Mark Hampton, A.I.A., Tampa, Fla.
 Marsh & Truman Lumber Co., Chicago, Ill.
 Martin Bros. Container & Timber Product Corp., The, Oakland, Oreg.

Mathieu Lumber & Supply Co., Blue Island, Ill.
 Mauk Mississippi Lumber Co., Meridian, Miss.
 Mauk Seattle Lumber Co., Seattle, Wash.
 May Plywoods, Inc., Chicago, Ill.
 Maynard Sash & Door Co., Amarillo, Tex.
 Maynor Lumber Co., Houston, Tex.
 McClone Lumber & Supply Co., Menasha, Wis.
 McKenzie River Plywood Corp., Springfield, Oreg.
 McQuesten, George, Co., Inc., North Billerica, Mass.

Meadow River Lumber Co., The, Rainelle, W. Va.
 Medford Veneer & Plywood Corp., Medford, Oreg.
 Menasha Plywood Division of Menasha Wooden Ware Corp., North Bend, Oreg.
 Metropolitan Millwork, Inc., Brooklyn, N.Y.
 Mid-Valley Lumber Co., Geneva, Ill.
 Mid-West Lumber Co., Lincoln, Nebr.
 Miller Sash & Door Co., Kalamazoo, Mich.
 Miller, Vrydagh & Miller, Architects, Terre Haute, Ind.
 Mirschel Lumber & Supply Corp., Franklin Square, Long Island, N.Y. (General Support).
 Monarch Plywood Sales, Inc., Tacoma, Wash.
 Moore's Wholesale Builders Supply, Richmond, Va.
 Moorman Lumber & Supply Co., Inc., Ypsilanti, Mich.
 Mulhall-Erb Co., Owosso, Mich.

Nahlik Lumber Co., Inc., St. Louis, Mo.
 National Plywood, Inc., Roseburg, Oreg.
 National Plywoods, Inc., Chicago, Ill.
 National Wholesalers, North Haven, Conn.
 Newton Lumber Corp., Brooklyn, N.Y.
 Nixon Lumber Co., Inc., Memphis, Tenn.
 Noble Sales Co., Elwood, Ind.
 Nordic Plywood, Inc., Sutherlin, Oreg.
 North Pacific Plywood, Inc., Tacoma, Wash.
 North Side Lumber Co., North Birmingham, Ala.
 Northbrook Lumber Co., Northbrook, Ill.
 Northern California Plywood, Inc., Crescent City, Calif.
 Northern Plywood & Door Co., Minneapolis, Minn.
 Northwest Door Co., Division of St. Regis Paper Co., Tacoma, Wash.
 Northwest Plywoods, Portland, Oreg.
 Nurenborg, W. S., Fort Worth, Tex.

O. B. Williams Co., Seattle, Wash.
 Oklahoma Sash & Door Co., The, Oklahoma City, Okla.
 O'Leary, Paul, Lumber Corp., Meridian, Miss.
 Oregon Plywood Sales Corp., Buffalo, N.Y.
 Oregon-Washington Plywood Co., Garibaldi, Oreg.
 Oroproly Corp., Oroville, Calif.
 Osage Building Material Co., Pawhuska, Okla.

Pacific Cement & Aggregates, Inc., San Francisco, Calif.
 Pacific Coast Co., The, Sonoma, Calif.
 Pacific Coast Lumber Company of California, San Luis Obispo, Calif.
 Pacific Forest Industries, Tacoma, Wash.
 Pacific Lumber Dealers Supply, Inc., Harbor City, Calif.
 Pacific Plywood Co., Dillard, Oreg.
 Pageant Homes, Inc., Lansing, Mich.
 Park Lumber Co., Inc., The, Pleasure Ridge Park, Ky.
 Patterson Plywoods Corp., Birmingham, Ala.
 Paulsen, M. H., Lumber Co., Milwaukee, Wis.
 Pease Woodwork Co., Hamilton, Ohio.
 Peninsula Door & Plywood, Inc., Mountain View, Calif.
 Peninsula Plywood Corp., Port Angeles, Wash.
 Phillips Plywood Co., North Hollywood, Calif.
 Pickering Lumber Corp., Standard, Calif.
 Pioneer Wholesale Supply Co., Salt Lake City, Utah.
 Plastic Products & Plywood Co., Charleston, W. Va.
 Plunkett Webster Lumber Co., Inc., New Rochelle, N.Y.
 Plywood Builders Supply Co., Southfield, Mich.
 Plywood Distributors, Inc., Lansing, Mich.
 Plywood Distributors, Inc., Houston, Tex.
 Plywood Products Corp., Corvallis, Oreg.
 Pratt & Whitney Aircraft, East Hartford, Conn.
 Prinshe Veneer Co., Inc., Valdosta, Ga.
 Prouditt, R. S., Co., Lincoln, Nebr.
 Puget Sound Plywood, Inc., Tacoma, Wash.

Radio Corporation of America, Camden, N.J.
 Ramsey, A. H., & Sons, Inc., Miami, Fla.
 Rawlings, Wayne I., Sales Co., San Rafael, Calif.
 Ray Hill Lumber Co., Los Angeles, Calif.
 Ray Young, Radburn, Fair Lawn, N.J.
 R. D. Brook's Grand Rapids Building Specialties Inc., Grand Rapids, Mich.
 Reeb Millwork Corp., Roselle Park, N.J.
 Reichhold Chemicals, Inc., Pacific Northwest Division, Seattle, Wash.
 Relints Sash & Door, Oklahoma City, Okla.
 Renn Plywood Co., Jenkintown, Pa.
 Reserve Lumber Co., Cleveland, Ohio.
 Reserve Supply of Florida, Inc., Hollywood, Fla.
 Rex Oxford Lumber Co., Los Angeles, Calif.
 Richardson, David A., Co., Klamath Falls, Oreg.
 Rinn-Scott Lumber Co., Chicago, Ill.
 Robbins-Quigley Co., Gloucester City, N.J.
 Roddis Plywood Corp., Atlanta, Ga.
 Roddis Plywood Corp., Cincinnati, Ohio.
 Roddiscraft, Inc., Arcata, Calif.
 Rosboro Lumber Co., Springfield, Oreg.
 Roseburg Lumber Co., Roseburg, Oreg.

St. Paul & Tacoma Lumber Co., Plywood Dept., Olympia, Wash.
 St. Paul & Tacoma Lumber Co., Division of St. Regis Paper Co., Tacoma, Wash.
 Samreco Lumber & Supply, Santa Monica, Calif.
 San Diego, City of, City Engineer, San Diego, Calif.
 Santa Fe Lumber, Inc., San Francisco, Calif.
 Saunders, George R., Structural Engineer, San Diego, Calif.
 Sawelle Lumber Co., West Los Angeles, Calif.
 Schnieder, Herbert C., Grand Rapids, Mich.

School Lumber Co., Bethlehem, Pa.
 Schraufnager Wholesale, Inc., Green Bay, Wis.
 Scott Lumber Co., Amarillo, Tex.
 Sears, Roebuck & Co., Chicago, Ill.
 Seattle Door Co., Inc., Kirkland, Wash.
 Shehan-Cary Lumber Co., St. Louis, Mo.
 Shepherd, John C., Lumber Corp., Charlotte, N.C.
 Shield Fabricators, Inc., Gardena, Calif.
 Short, Wm. H., Lumber Co., Inc., West Hartford, Conn.
 Sierra Mill & Building Materials Co., Sacramento, Calif.
 Silver Spring Building Supply Co., Silver Spring, Md.
 Simpson Logging Co., Shelton, Wash.
 Skyline Lumber Co., Inc., Roanoke, Va.
 Smith, A. J., Co., Nashville, Tenn.
 Smith Builders Supply, Inc., Wilmington, N.C.
 Smith Plywood Supply Co., Inc., Pleasantville, N.Y.
 Snellstrom Lumber Co., Eugene, Oreg.
 Southern Oregon Plywood, Inc., Grants Pass, Oreg.
 Southwest Housing Co., Dallas, Tex.
 Southwestern Sash & Door Co., Joplin, Mo.
 Spear Lumber Co., Cheyenne, Wyo.
 Standard Lumber Co., Spokane, Wash.
 Stark, W. P., Lumber Co., Inc., Kansas City, Kans.
 Steele & Hibbard Lumber Co., St. Louis, Mo.
 Stephan, W. G., Consulting Engineer, Miami, Fla.
 Stevenson Co-Ply, Inc., Stevenson, Wash.
 Stockmann, H. A., Lumber Co., St. Louis, Mo.
 Stringfellow Supply Co., Gainesville, Fla.
 Sunset Plywood Co., Los Angeles, Calif.
 Swan Lake Moulding Co., Klamath Falls, Oreg.
 Synvar Corp., Wilmington, Del.

Tacoma Box & Lumber Co., Tacoma, Wash.
 Tarter, Webster & Johnson, Inc., San Francisco, Calif.
 Texas Sash & Door Co., Fort Worth, Tex.
 Thompson Lumber Co., Champaign, Ill.
 Tillamook Veneer Co., Tillamook, Oreg.
 Timber Products Co., Medford, Oreg.
 Timberline, Inc., Kansas City, Mo.
 Travco, Inc., San Jose, Calif.
 Tri-State Plywood Co., Santa Clara, Calif.
 Trumbo, M., Co., Inc., Portland, Oreg.
 Tulane Hardwood Lumber Co., Inc., New Orleans, La.
 Turner, J. C., Lumber Co., Irvington-on-Hudson, N.Y.
 Turover, I. S., Bethesda, Md.
 Twin City Hardwood Lumber Co., St. Paul, Minn.
 Tylander's Inc., West Palm Beach, Fla.

Union Lumber Co., Fort Bragg, Calif.
 United Plywoods Corp., Birmingham, Ala.
 United Plywoods Corp., Montgomery, Ala.
 United States Plywood Corp., Redding, Calif.
 United States Testing Co., Inc., Hoboken, N.J.

Vanderweele-Richter-Hatto Lumber Co., Inc., Ann Arbor, Mich.
 Van-Evan Co., Missoula, Mont.

Van Patten Lumber Co., Ontario, Oreg.
 Vaughan, Geo. C., & Sons, San Antonio, Tex.

Wallace & Herring Inc., Alexandria, Va.
 Washington Plywood Co. Inc., Everett, Wash.
 Welch, Carroll E., Registered Architect, Huntington, N.Y.
 West Coast Mills, Chehalis, Wash.
 West Coast Plywood Co., Aberdeen, Wash.
 West End Lumber Co., The, Cleveland, Ohio.
 Western Builders Supply, Billings, Mont.
 Western Plywood Co., Seattle, Wash.
 Western States Plywood Cooperative, Port Orford, Oreg.
 Weyerhaeuser Co., Tacoma, Wash.
 Whissel, L. N., Lumber Co., Inc., Buffalo, N.Y.
 White, H. A., Seattle, Wash.
 Whitnall Park Millwork & Lumber Co., Hales Corners, Wis.
 Wiklund Wholesale Co., Inc., Appleton, Wis.
 Wilbur Lumber Co., West Allis, Wis.
 Willamette Sheathing Corp., Arcata, Calif.
 Williamson, Loebsock & Associates, Architects, Topeka, Kans.
 (General Support)
 Winberly & Thomas Hardware Co., Inc., Birmingham, Ala.
 Winton Lumber Co., Martell, Calif.
 Wisconsin's Transfer Yard, Oshkosh, Wis.
 Wood Ply Corporation of America, Linden, N.J.
 Woodward Lumber Co., Seattle, Wash.
 Woodwork Distributors, Inc., Knoxville, Tenn.
 Wrenn Lumber Corp., Greensboro, N.C.

Zuber Lumber Co., Atlanta, Ga.

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 (General Support)
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OTHER COMMERCIAL STANDARDS

A list of Commercial Standards may be obtained from the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. This list includes the purchase price of the publication and directions for ordering copies.

ACCEPTANCE OF COMMERCIAL STANDARD

CS45-60 Douglas Fir Plywood

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date _____

Commodity Standards Division
Office of Technical Services
Business and Defense Services Administration
U. S. Department of Commerce
Washington 25, D. C.

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹
of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer _____
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____

(Fill in exactly as it should be listed)

Street address _____

City, zone, and State _____

¹ Underscore the applicable words. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interest, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

(Cut on this line)

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard, where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function, performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a nationwide basis is fourfold: First, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.